LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

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Longhorn Army Ammunition Plant

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LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD – CHRONOLOGICAL INDEX

VOLUME 3

2014

A.	Title:	Report - Final LHAAP-29 Remedial Investigation/Feasibility Addendum Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	AECOM Technical Services
	Recipient:	U.S. Army Corps of Engineers
	Date:	June 23, 2014
	Bate Stamp:	00190283 – 00190342
B.	Title:	Report - Final Baseline Ecological Risk Assessment Addendum, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	AGEISS Inc.
	Recipient:	U.S. Army Corps of Engineers
	Date:	July 8, 2014
	Bate Stamp:	00190343 – 00190586
C.	Title:	Meeting Minutes – Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
	Author(s):	AECOM Technical Services
	Recipient:	All Stakeholders
	Date:	July 15, 2014
	Bate Stamp:	00190587 – 00190590
D.	Title:	Report - Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas
	Author(s):	AECOM Technical Services
	Recipient:	U.S. Army Corps of Engineers
	Date:	July 21, 2014
	Bate Stamp:	00190591 – 00191445
E.	Title:	Meeting Minutes – Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
	Author(s):	AECOM Technical Services
	Recipient:	All Stakeholders
	Date:	August 7, 2014
	Bate Stamp:	00191446 – 00191450

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD – CHRONOLOGICAL INDEX

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F.	Title:	Meeting Minutes – Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
	Author(s):	AECOM Technical Services
	Recipient:	All Stakeholders
	Date:	September 11, 2014
	Bate Stamp:	00191451 – 00191512

DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
POST OFFICE BOX 220
RATCLIFF, AR 72951

June 23, 2014

DAIM-ODB-LO

Mr. Rich Mayer
US Environmental Protection Agency
Federal Facilities Section R6
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Final LHAAP-29 Remedial Investigation/Feasibility Addendum Work Plan
Longhorn Army Ammunition Plant, Karnack, Texas, June 2014

Dear Mr. Mayer,

The above-referenced document is being transmitted for your records. The document was prepared by AECOM on behalf of the Army as part of AECOM's Performance Based Remediation contract for the facility. I ask that Dave Wacker, AECOM's Project Manager, be copied on any communications related to the project.

The point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

Rose M. Zeiler, Ph.D.
Longhorn AAP Site Manager

Copies furnished:
A. Palmie, TCEQ, Austin, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
R. Smith, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
R. Paul, USAEC, San Antonio, TX
D. Wacker, AECOM – San Antonio, TX (for project files)

DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
POST OFFICE BOX 220
RATCLIFF, AR 72951

June 23, 2014

DAIM-ODB-LO

Ms. April Palmie
Texas Commission on Environmental Quality Superfund Section, MC-136
12100 Park 35 Circle, Bldg D
Austin, TX 78753

Re: Final LHAAP-29 Remedial Investigation/Feasibility Addendum Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas, June 2014

Dear Ms. Palmie,

The above-referenced document is being transmitted for your records. The document was prepared by AECOM on behalf of the Army as part of AECOM's Performance Based Remediation contract for the facility. I ask that Dave Wacker, AECOM's Project Manager, be copied on any communications related to the project.

The point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

Rose M. Zeiler

Rose M. Zeiler, Ph.D.
Longhorn AAP Site Manager

Copies furnished:
R. Mayer, USEPA Region 6, Dallas, TX
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R. Paul, USAEC, San Antonio, TX
D. Wacker, AECOM, San Antonio, TX (for project files)

Response to Comments on
Draft Remedial Investigation/Feasibility Study Addendum Work Plan LHAAP-29
Longhorn Army Ammunition Plant, Karnack, Texas

Document Date February 4, 2014
TCEQ Comments Date February 27, 2014
EPA Comments Date February 28, 2014

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Section; pg.	Comments	C, D, E or X[1]	Response	A or D[2] TCEQ 032714 EPA 4/8/14	Response To EPA 4/15/14	A or D[2] From EPA 4/30/14
TCEQ Comments							
1.	BERA Addendum Data	Please be certain to include any necessary changes discussed in Aaron William's e-mail dated 2/12/14 and TCEQ's response dated 2/14/14.	C	Inset #1 has been removed from Figure 3-3 as indicated in Aaron William's email dated 2/12/14 and TCEQ response dated 2/14/2014. The proposed soil sampling locations in Inset #7 (now Inset #6) have also been revised based on TCEQ email dated 2/14/2014. Two additional surface soil samples have been added to define the extent of TNT due to exceedance of the GWP-Ind goal in BERA sample 29SB09R (14.7 mg/kg) northwest of Building 806-A.	A		
2.	Figure General	Please add Figure 1-3 from the FS. This figure includes each building and a handy table of processes.	C	Figure 1-3 from the FS has been added as Figure 1-4.	A		
3.	1.2; 1-7	Minor edit to this sentence "Concrete foundations [add comma] open-top concrete-lined pits…"	C	Comment incorporated.	A		
4.	1.5 and 1.5.1; 1-9 And Figure 2-2	If the purpose of this effort is to address significant data gaps, additional investigation is also required for the explosives in shallow groundwater. These plumes are not delineated. There are four data points drawn as if they represent three distinct plumes. There is no additional data to support the depiction of these plumes. Relevant shallow wells should be sampled for explosives in this investigation. In addition, new monitoring points are required south or southwest of 29WW03 and in the vicinity of 29WW05 and 116May2005.	D	The purpose of this effort is to refine the size of the DNAPL plume, because a larger volume has the potential to render the selected remedy ineffective as indicated in the letter from the Army to TCEQ and USEPA dated 11/26/2013. It is also the purpose of this effort to consider an additional treatment technology. Because the distribution of the shallow groundwater plume would not impact the selected remedy or the alternatives identified in the FS, it is considered beyond the scope of this work plan. However, Army recognizes that the boundary to the west of 29WW03 is inferred and it will be addressed during the RD phase. Army acknowledges that the additional soil sampling for explosives does not align with the intent expressed in the 11/26/2013 letter, however, in an effort to close the data gap created by the recall of the ITS data that would not be filled by the BERA Addendum	A – Figure 2-2 does not indicate the ND wells making it look like only the wells in the center of the plume were sampled. Please revise Figure 2-2 or include Figure 2-10 from the ROD. My original comment would have been much different if the Figure had been more complete in reflecting the May 2005 sampling event.		

Comment #	Section; pg.	Comments	C, D, E or X[1]	Response	A or D[2] TCEQ 032714 EPA 4/8/14	Response To EPA 4/15/14	A or D[2] From EPA 4/30/14
				and to conduct confirmation sampling along the wooden TNT pipeline identified in the draft ROD, several areas of soil sampling are identified.			
5.	2.1; 2-1	This section states that the "deep groundwater zone at LHAAP-29 is not affected." The existing deep groundwater well network is not sufficient to make this conclusion. Additional deep water well(s) should be installed in vicinity of (or nested with) proposed 29CPT06/09 to capture likely downgradient flow from 29WW16 area wells. The existing additional deep well 28WW08 is not likely to be directly down gradient of the MC hot spot.	E	Deep monitoring wells near MC hot spot 29WW16 include 29WW40 (within 10 feet) and 29WW41 (approximately 60 feet downgradient). In 29WW40, methylene chloride was detected at 215 µg/L in 29WW40 in September 2006 believed to be associated with drilling issues. The well was subsequently sampled three additional times in 2006 showing a decreasing trend to non-detect in December 2006. In 29WW41, methylene chloride was not detected in June 2009. Sampling of deep groundwater wells or installation of additional wells is not supported based upon the information above; however, the statement in the Work Plan that "deep groundwater zone at LHAAP-29 is not affected" has been replaced with a discussion of the historic deep groundwater data.	A – Please note that well 29WW41 is not included on ANY Of the Figures. It should be added to all Figures and Cross Section(s)		
6.	General	Note – comments 4 and 5 have impacts throughout the document which would also need to be addressed.	E	See RTC for comments 4 and 5.	A		
7.	4.2.1; 4-1	Why is the design depth 10 feet bgs? The cross sections suggest the soil/water interface is considerably deeper. A deeper set point within the overbank deposits might be more effective.	C	Clarification. The depth of investigation for soil gas is 10 feet bgs to shallow groundwater and the text in this section has been revised to reflect this statement.	A		
8.	4.2.2, 4-1	Second bullet – Suggest revising to "The core or acetate sleeve will be retained to allow examination by the Army and regulators." [remove duration]	C	Representative cores will be retained, and we have added this to the text in lieu of the text suggested.	A		
1.	Not applicable	**General Comments:** EPA agrees with comments number 3 and 4 from the TCEQ in an email dated 2/27/14 from April Palmie to the Army regarding the groundwater at Site 29. EPA also concurs with TCEQ comments number 2 and 8.	E	Please refer to our responses to these TCEQ comment above.	D - EPA does not believe the explosive plumes are delineated and this should be completed during the RI phase (not the RD). For the explosive plume (one well plume) in monitoring well 29WW03 a well should be place south-southwest approximately 150 -200 feet. For the explosive plume found in monitoring wells 116 and 29WW05, since the groundwater flows to the east, a monitoring well should be placed near the location of deep well 29WW34. For the explosive plume (one well plume) in monitoring well 29WW20, since the groundwater flows to the east –southeast, a well should be placed approximately 200 feet to the east-southeast. Since the Army is conducting remedial investigations at the site, it makes logical sense to **complete** the delineation of each of the explosives plumes during this phase of the CERCLA process and while the equipment/rigs are there (to save mobilization/demobilization costs and time).	Do not concur. The three shallow zone explosive plumes presented on Figure 2-2 are bound by the surrounding wells where explosives were not detected (refer to the data table presented on Figure 2-3 of the FS report, Shaw 2010). Monitoring well 29WW03 is located at the southwest end of the pipeline. Based on the predominant easterly groundwater flow direction in shallow zone, contamination is not expected to exist to the south or southwest of well 29WW03. The explosive plume in the vicinity of wells 116 and 29WW05 is bounded in four directions by four monitoring wells where explosives were not detected. There is no driver for additional shallow zone wells as part of this effort.	D - EPA still believes that the shallow explosive plumes contain data gaps and the plumes need to be refined. For the explosive/perchlorate plume found in monitoring wells 116 and 29WW05, since the groundwater flows to the east (although there is a GW mound or high at these wells), a monitoring well should be placed near the location of intermediate zone well 29WW34. The nearest down gradient shallow monitoring well is approximately 450 feet to

Comment #	Section; pg.	Comments	C, D, E or X[1]	Response	A or D[2] TCEQ 032714 EPA 4/8/14	Response To EPA 4/15/14	A or D[2] From EPA 4/30/14
							the northeast of monitoring well 116. For the explosive plume (one well plume) in monitoring well 29WW20, since the groundwater flows to the east –southeast, the nearest down gradient shallow monitoring well is 650 feet to the east. A well should be placed approximately 200 -300 feet to the east of 29WW20. For the explosive plume (one well plume) in monitoring well 29WW03l, there are no monitoring wells to the west and south (as noted by dashed contours). Since the groundwater flow direction is to the south-southeast, the nearest down gradient shallow monitoring well is 29WWW32, which is 450 feet to the south-southeast of 29WW03. EPA recommends a well approximately 200-300 feet south of 29WW03 to completely define the plume and add a control point for the groundwater elevations.
2.	4.2.1; 4-1	**Direct Push Soil Gas Survey:** Please clarify the objective in this section; is it to determine soil contamination or soil gas? It is EPA's interpretation that it is for determining VOCs in soil gas from 10 feet bsg to the shallow groundwater.	C	The objective of soil gas survey is to screen the target areas for evidence of VOC source area in soil, and to avoid cross-contamination during CPT/MIP investigation. The first sentence in this section is revised for clarity.	A		
3.	Not applicable	**General Comment:** EPA also believes that the following wells (at a minimum) should be sampled (for the appropriate contaminants) since the wells have not been sampled in at least 6 years or more. They are: 116, 29WW05, 29WW20, 29WW03, 29WW15, 29WW16, 29WW40 and 29WW35. Looking at historical results, EPA found that monitoring well 29WW35 contained MC (high of 8700 ppb) and TCE (high of 125 ppb) from several samples taken in 2006-2007. Also, the boring log for 29WW35 had elevated PID readings from 12 feet to 46 feet, with the highest reading of 209 ppm at 32 feet.	E	Refer to the response to TCEQ comment #4 regarding the purpose of this effort. Sampling of existing monitoring will be conducted as needed during the Remedial Design phase.	D - EPA still believes that the wells mentioned should be sampled (especially since most of the wells at this site have not been sampled in 6-8 years) while the Army is conducting remedial investigations at the Site. EPA most likely will have their contractor sample these wells in the upcoming months.	Do not concur. Had EPA HQ not begun a dispute with Army in 2011, this would not be an issue. The dispute has dragged out almost 3 years already and it is uncertain how much longer it will go on. The fact that the plumes are small and well-contained within the interior of the installation means there is no risk to the public. Sampling of all of the wells is not included in the current contract, but is anticipated for the next step.	D - While the dispute has not been resolved since 2011, the dispute does not forbid/restrict the Army from sampling monitoring wells at any of the sites at Longhorn. EPA most likely will have their contractor sample these wells in the upcoming months, since they have not been sampled in over six to eight years.
4.	2.1.2; 2-2	**Shallow Zone Groundwater, 1st Paragraph:** The paragraph mentions metals as COCs for groundwater; however,	E	Please refer to the response to TCEQ comment #4. Metal distribution is not within the scope of this addendum. Reference to	A		

Comment #	Section; pg.	Comments	C, D, E or X[1]	Response	A or D[2] TCEQ 032714 EPA 4/8/14	Response To EPA 4/15/14	A or D[2] From EPA 4/30/14
		there are no Figures to depict the plumes for arsenic, mercury, and nickel. Please clarify.		metals has been deleted from Section 2.1.2.			
5.	4.2.2; 4-2	**Page 4-2, First Paragraph:** When taking the groundwater samples, what is the time to allow for equilibration?	E	Attachment 16 – Direct Push Technology addresses groundwater grab sampling. Sampling is typically completed upon recharge similar to when a well is bailed dry	A		
6.	4.2.2; 4-2	**Page 4-2, 3rd Paragraph:** Please add the soil resistivity method (ASTM 187-12a) and the technical bulletin *Direct Push Installation of Devices for Active Soil Gas Sampling & Monitoring (Geoprobe, 2006)* to the IWWP. Also, VOC soil samples should be collected with an encore sampling cartridge.	C	The soil resistivity analysis method (ASTM 187-12a) and the cited technical bulletin will be included in the IWWP. The second bullet in section 4.2.2 is revised to reflect EnCore soil sampling procedure.	A		
7.	4.2.1; 4-1	**Geoprobe 2006 Technical Bulletin:** After reviewing this bulletin, EPA prefers the use of the Post Run Tubing Sampling system. This method will eliminate potential leaks at each rod joint, eliminates some contaminants from being sorbed or degraded on the metal surface of the drive rods and eliminates decontamination of steel rods between each use.	C	Soil gas sampling method is changed to Post Run Tubing Method. Refer to revision made in Section 4.2.1.	A		
8.	Table 3-1	**Hot Spot Locations GPS-12 and 29SB15:** EPA assumes the existing soil samples identified in the table are still going be taken. The drainage ditch was a likely source for the "explosives plume" in shallow monitoring wells 116 and 29WW05.	D	Existing soil samples identified in Table 3-1 will not be resampled. Soil samples will be collected near 29SD13 (refer to updated Figure 3-3 and Table 3-1) which are in the vicinity of wells 116 and 29WW05. However, the purpose of these samples is to fill the data gap for explosives in soil created by the removal of the ITS data set yet not filled with the new BERA samples (refer to RTC to TCEQ Comment #1).	A		
9.	Not applicable	**Monitoring well 29WW15:** This well should also be analyzed for 1,4-dioxane as historical results indicate the degradation products (1,1- DCA and 1,1- DCE) of 1,1,1 –TCA. This also applies to other wells at the site which have historically detected the degradation products.	D	Please see the response to TCEQ comment #4. 1,4-dioxane sampling is being addressed programmatically at Longhorn.	EPA will sample for this constituent when the EPA contractor samples the monitoring wells at this site in the upcoming months.	Noted.	
10.	3.1; 3-1	**Page 3-1, 1st Bullet:** It is EPA's understanding that the soil gas surveys for the intermediate groundwater MC plume and Bldg. 801-F areas are to determine whether VOCs are in soil gas from 10 feet below surface grade (bsg) to the shallow aquifer. If VOCs are found, then the deeper investigations (vertically below the shallow aquifer) will need to use procedures to prevent cross contamination for the CPT/MIP investigations. Is that correct?	C	That is correct.	A		
11.	3.3.1; 3-5	**Page 3-5, Plume Characterization Data Gaps:** The soil gas survey or the CPT/MIP investigation should also be used to place a	D	Installation of additional shallow zone monitoring wells is outside the scope of this RI/FS Addendum Work Plan.	D - As mentioned earlier, there is a data gap to the east of monitoring well 29WW15, which contains perchlorate, 1,2-dichloroethane and TCE above the MCL. The nearest shallow	Do not concur. Well 29WW15 is surrounded by six shallow wells (29WW07, 29WW17 through 29WW20, and 29WW22) which had no detectable	D - EPA agrees that the monitoring well is surrounded, for the most

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		shallow groundwater well east of monitoring well 29WW15. Since groundwater flow is to the east, there currently is no shallow monitoring well to bound the plume (currently a 1 well plume) to the east.			monitoring well is 29WW07, which is approximately 750 feet to the east-northeast. Since the groundwater flows to the east, a MIP boring (already at the site for the methylene chloride DNAPL investigation) can be used to determine the best location for a monitoring well to the east. As mentioned above, since the Army is conducting investigations at the site, it make logical sense to **complete** (save mob and demob costs) the delineation of this plume during the remedial investigation phase of the CERCLA process.	perchlorate or VOCs and, therefore, adequately bound the plume. Installation of additional shallow zone monitoring wells is outside the scope of this RI/FS addendum Work Plan designed to evaluate the potential intermediate groundwater zone remedy.	part, with shallow monitoring wells to the north, west, and south; however, EPA believes that there is still data a gap to the east (especially since the groundwater flow is to the east), since the nearest down gradient shallow monitoring well (29WW07) is approximately 750 feet to the northeast. This is why EPA recommends at least one MIP location approximately 200-300 feet east of MW29WW15 to close this data gap at this location.
12.	Not applicable	**Monitoring Wells with Explosives:** EPA recommends analyzing these wells for the 4 minor or lesser isomers of DNT. The analytical method being used at the Badger Army Ammunition Plant is SW-846 8270C SIM.	D	Besides there being no regulatory driver, the proposed activity is outside of the scope of the current work effort.	EPA will have their contractor sample the identified wells for those constituents.	Noted.	

FINAL

REMEDIAL INVESTIGATION/FEASIBILITY STUDY ADDENDUM WORK PLAN

LHAAP-29, FORMER TNT PRODUCTION AREA, GROUP2

LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

June 2014

FINAL

REMEDIAL INVESTIGATION/FEASIBILITY STUDY ADDENDUM WORK PLAN

LHAAP-29, FORMER TNT PRODUCTION AREA, GROUP 2

LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

Prepared For:

U.S. Army Corp of Engineers

Tulsa District

Prepared By:

AECOM Technical Services, Inc.

Contract No. W912DY-09-D-0059

Task Order No. DS01

June 2014

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Acronyms and Abbreviations

µg/L	micrograms per liter
AECOM	AECOM Technical Services, Inc.
bgs	below ground surface
Bio-SEP®	an engineered composite of Nomex and PAC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
COPEC	contaminant of potential ecological concern
CPT	cone penetrometer
DCA	dichloroethane
deg C	degrees centigrade
DIC	dissolved inorganic carbon
DNAPL	dense non-aqueous phase liquid
DNT	dinitrotoluene
DoD	Department of Defense
DPT	direct-push technology
EISB	enhanced in-situ biological remediation
ERH	electrical resistance heating
EVO	emulsified vegetable oil
FFA	Federal Facility Agreement
FS	Feasibility Study
ft	foot or feet
GW-Ind	industrial use for groundwater
GWP-Ind	industrial use for groundwater protection
HASP	Health and Safety Plan
IDW	investigation-derived waste
ISCO	in-situ chemical oxidation
ISTD	in-situ thermal desorption
LHAAP	Longhorn Army Ammunition Plant
LUC	Land Use Control
MC	methylene chloride
MCL	maximum contaminant level

mg/kg	milligrams per kilogram
MIP	membrane interface probe
MNA	Monitored Natural Attenuation
MSC	medium specific concentration
NPL	National Priorities List
NT	nitrotoluene
ORC®	oxygen release compound
PAC	powdered activated carbon
PID	photoionization detector
PLFA	phospholipid fatty acids
PPE	personal protection equipment
RI	Remedial Investigation
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SIP	stable isotope probing
TCE	trichloroethene
TCEQ	Texas Commission on Environmental Quality
TNT	trinitrotoluene
TOC	total organic carbon
U.S.	United States
U.S. Army	U.S. Department of the Army
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound
Work Plan	RI/FS Addendum Work Plan

1 INTRODUCTION

AECOM Technical Services, Inc. (AECOM) has been contracted by the United States (U.S.) Army Corps of Engineers (USACE), Tulsa District, to perform remediation activities at various sites at Longhorn Army Ammunition Plant (LHAAP), Texas. The former LHAAP is an inactive, government-owned, formerly contractor operated and maintained, Department of Defense (DoD) facility located in central east Texas (**Figure 1-1**) in the northeast corner of Harrison County. LHAAP is approximately 14 miles northeast of Marshall, Texas, and approximately 40 miles west of Shreveport, Louisiana. The former U.S. Department of the Army (U.S. Army) installation occupied 8,416 acres between State Highway 43 at Karnack, Texas, and the southwestern shore of Caddo Lake. The facility can be accessed via State Highways 43 and 134.

LHAAP was placed on the U.S. Environmental Protection Agency (USEPA) National Priorities List (NPL) on August 9, 1990. Activities to remediate contamination began in 1990. After its listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission (currently known as the Texas Commission on Environmental Quality [TCEQ]) entered into a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §120 Federal Facility Agreement (FFA) for remedial activities at LHAAP. The FFA became effective December 30, 1991. LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army Armament, Munitions, and Chemical Command as excess property. The majority of LHAAP has been transferred by the U.S. Army to the U.S. Fish and Wildlife Service for management as the Caddo Lake National Wildlife Refuge.

This work will be performed under USACE Huntsville District's Worldwide Environmental Remediation Services Contract No. W912DY-09-D-0059 Task Order No. DS01. The U.S Army Environmental Command provides funding for the environmental remedial activities at LHAAP. The Base Realignment and Closure Division is responsible for all aspects of LHAAP including the environmental program, operations, and land transfer.

This Remedial Investigation/Feasibility Study (RI/FS) Addendum Work Plan (Work Plan) describes the proposed activities to address data needs and remedial technology evaluations required to supplement the RI (Jacobs, 2001) and FS (Shaw, 2010) at LHAAP-29, Former trinitrotoluene (TNT) Production Area. The results of the activities described in this Work Plan will be summarized in an RI/FS Addendum.

1.1 Organization of Work Plan

This Work Plan is composed of the following sections:

- Section 1: "Introduction" summarizes the site background including previous investigation and remediation activities, and provides the purpose and rationale for, the proposed RI/FS Addendum.
- Section 2: "Conceptual Site Model" describes the contaminant transport mechanisms, environmental exposure pathways, and the nature and extent of contamination based on existing data.
- Section 3: "Proposed Activities" describes the proposed scope of work and the sampling and analysis rationale to supplement the existing RI and FS for LHAAP-29.

- Section 4: "Investigation and Testing Methods" describes the various field investigation and sampling protocols that will be used to collect the required data, including means to manage investigation-derived wastes (IDWs).
- Section 5: "References" provides a list of references cited in this document.

Activities specified in this work plan will be conducted in accordance with the Installation-Wide Work Plan (IWWP) in place when field work is executed.

1.2 LHAAP-29 Background

LHAAP-29, Former TNT Production Area is an 85-acre site located within a heavily wooded section in the western-central portion of LHAAP (**Figure 1-2**). Remaining features of former facilities at LHAAP-29 include the foundations for the former production facilities and the underground pipe lines that were originally built for cooling water drainage and TNT wastewater conveyance (**Figure 1-3**). The site is currently heavily wooded.

LHAAP-29 was used as a TNT manufacturing facility from October 1942 to August 1945. The facility produced approximately 400 million pounds of flake TNT during its operation using six TNT production lines (five active and one standby). The TNT production facility was inactive from August 1945 to 1959. In 1959, most of the buildings and aboveground storage tanks were removed. The debris was burned or flashed at Burning Ground No. 2/Flashing Area (LHAAP-17). Concrete foundations, open-top concrete-lined pits, most of the underground utilities, and a network of underground pipelines still remain at the site. Since the end of World War II, the only activity that has been documented to have occurred at LHAAP-29 is the "soak out" or solvent bath of out-of-specification rocket motors. This took place from 1959 to the mid-1970s and involved the use of methylene chloride (MC)-based industrial solvent at tank 801-F. Waste from this operation was sent to LHAAP-18/24 (Jacobs, 2001). Figure 1-4 presents the site layout with brief descriptions of the activities, materials handled and usage of the former buildings and the underground pipelines.

1.2.1 Surface Water Hydrology

Surface runoff at LHAAP-29 is collected by ditches constructed in 1942 when the production facility was built. Surface runoff from the northern part of the site (about 40 percent of the site) enters Goose Prairie Creek located approximately 1,500 feet (ft) to the north and east of the site. Surface water runoff in the southern portion of the site (about 60 percent of the site) flows into a tributary of Central Creek located near the southeast portion of the site. Eventually, runoff from the two creeks enters Caddo Lake. The lake is a source of drinking water for several neighboring communities.

1.2.2 Geology and Hydrogeology

The LHAAP-29 site is located on the southern edge of the Big Cypress Bayou Floodplain where modern alluvium directly overlays older sediments. The stratigraphy at LHAAP-29 consists of silts, sands, and clays deposited in fluvial (riverine) and fluvial-deltaic (riverine and/or marine) settings (**Figures 1-5 and 1-6**). The stratigraphic architecture of fluvial and deltaic systems is generally called "cut-and-fill" because fluvial channels are cut into floodplain sediments

(silts/clays) and filled with coarser point bar and channel sediments (sands/gravels) prior to being abandoned and preserved as distinct sand/gravel bodies within a finer grained matrix.

In general the upper 30 ft of sediment at LHAAP-29 is alluvium associated with evolution of the modern Big Cypress Bayou, its floodplain, and its tributary streams. Underlying this are the semi-consolidated sediments of the Wilcox Formation, which consists of fluvial and fluvial-deltaic sediments deposited in the Eocene (approximately 50 million years ago). The elevation of contact between the Wilcox and overlying modern alluvium ranges from 180 to 210 ft, mean sea level in the area of LHAAP-29 and is irregular because the contact is an erosional surface created by exposure of the Wilcox, fluvial incision, and reworking of the Wilcox Formation sediments.

Shallow Unit, Modern Alluvium

The modern alluvium consists of silts and clays (likely low transmissivity) associated with floodplain deposition as well as coarser intervals of silty sands, clayey sands, and sands associated with abandoned channel, levee, and point bar deposits (higher transmissivity). This shallow interval is heterogeneous. In cross section view (**Figures 1-5 and 1-6**), there are discrete sand bodies encapsulated within the sheet-like deposits of floodplain clays and silts. When mapped in plain view, channel and levee deposits tend to be linear and point bar and splay deposits tend to be crescent shaped. The three-dimensional depositional morphology of the sands is significant to consider when evaluating contaminant migration (i.e., groundwater analytical results and plume delineation). Channel and point bar sands tend to be 10-15 ft thick (with the exception of a 25-ft thick channel sand at 29WW38). Levee and splay (ruptured levee) deposits tend to be thinner, about 5 to 10 ft thick.

Wilcox Formation

The Wilcox sediments are semi-consolidated, despite their age (approximately 50 million years ago), and consist of a range of grain sizes similar to that found in the modern alluvium (clay to coarse sands). The depositional environment of the Wilcox Formation is similar as well though the scale of river and delta in which the sediments were deposited was likely much larger than the Big Cypress and its tributaries. The upper Wilcox fluvial sediments transition downward into deltaic and marine sediments, though an exact depth where this transition is complete is difficult to pinpoint and it would vary laterally. In cross section view (**Figures 1-5 and 1-6**) Wilcox channel and deltaic sands are significantly thicker (more than 20 ft thick on average) than the channel and point bar deposits of the overlying modern alluvium and more laterally continuous. Levee deposits within the Wilcox are of approximately 10 ft thickness. In cross section view the sands are, again, discrete bodies encapsulated within more laterally continuous clays and silts. Clay and silts were deposited in interdistributary and off shore settings.

Three groundwater zones were previously defined at LHAAP-29: shallow, intermediate, and deep. In general clay or silty clay sediments separate the three groundwater zones from one another. However, because of the incisive "cut-and-fill" nature of riverine and deltaic settings, there are locations where the ground water zones are not distinctly separated by a clay layer (see 29WW38, **Figure 1-6**). The shallow groundwater zone has wells that are screened at two depths (shallow and lower shallow); however, these wells have similar water level elevations and are all considered to be shallow zone wells. The depth of the shallow groundwater zone generally

ranges from 17 to 45 ft below ground surface (bgs) because of variable ground surface elevations across the site. The intermediate zone is less defined, but its depth has been measured to approximately 88 ft bgs. The deep groundwater zone extends to a depth of approximately 155 ft bgs. The predominant flow of both the shallow zone and intermediate zone groundwater is to the east/northeast based on November 2007 water levels. **Figures 1-7** and **1-8** illustrate the groundwater elevations in the shallow zone and intermediate zone, respectively.

1.3 Previous Investigations and Remedial Actions

The environmental media (soil, groundwater, surface water, and sediment) at LHAAP-29 have been the subject of numerous investigations to identify potential contamination, as summarized in **Table 1-1**.

The RI for LHAAP-29 (Jacobs, 2001) was issued in April 2001, and the FS (Shaw, 2010) including results of investigative activities performed in November 2004 and February 2005 was issued in April 2010. The soil, surface water and sediment sample locations from investigations performed to date at LHAAP-29 are presented on **Figure 1-9**. **Figures 1-7** and **1-8** include the well locations and elevation contours (based on fall 2007 data) for shallow and intermediate groundwater, respectively.

A Proposed Plan (U.S. Army, 2011) was issued in March 2011 and a draft Record of Decision (ROD) was submitted in September 2011 (Shaw, 2011). The selected remedy documented in the draft ROD included contaminated soil removal with off-site disposal, flushing and plugging of the pipelines, in-situ chemical oxidation (ISCO) treatment for the intermediate zone groundwater, Monitored Natural Attenuation (MNA), and Land Use Control (LUC).

1.4 History of CERCLA Enforcement Activities

Due to the releases of chemicals from facility operations, the USEPA placed LHAAP on the NPL on August 9, 1990. Activities to remediate contamination associated with the listing of LHAAP as a Superfund site began in 1990. After the listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission (currently known as the TCEQ) entered into a CERCLA) §120 FFA for remedial activities at LHAAP. The FFA became effective December 30, 1991. LHAAP-29 was one of the originally listed NPL sites in the FFA. All CERCLA enforcement activities to date have been performed under the assumption that future land-use will be industrial consistent with the reasonably anticipated future use as part of the Caddo Lake National Wildlife Refuge

1.5 Scope of RI/FS Addendum

Although previous RIs (**Section 1.3**) provided sufficient definition for the shallow zone groundwater plume beneath the site, the extents of impacts in soil and intermediate zone groundwater had not been adequately defined before preparation of the FS. In addition, the FS did not evaluate thermal treatment of the MC plume and screened out in-situ bioremediation prematurely. The following sections provide the rationale for additional RI of shallow soil and RI and remedial technology evaluations for intermediate zone groundwater. The results of the supplemental RI and FS activities described in this Work Plan will be combined in a RI/FS Addendum.

1.5.1 RI Data Gaps for Shallow Soil

During planning activities to finalize and subsequently implement the 2011 draft ROD (Shaw, 2011), it became evident that additional definition was required to confirm the appropriateness, scope and cost of the remedy (excavation) selected for the shallow soils in the FS (Shaw 2010). This Work Plan includes a rationale, scope and procedures to collect additional soil samples with the objective to fully define the extent of contaminants of concern (COCs) where they exceed the industrial soil cleanup standards for groundwater protection (GWP-Ind) or, if applicable, ecological risk levels included in the draft ROD (Shaw, 2011).

1.5.2 RI Data Gaps for Intermediate Zone Groundwater MC Plume

Groundwater data collected from intermediate zone monitoring well 29WW16 in 2008 indicated high MC concentrations (10,300,000 micrograms per liter [µg/L]). Although the RI for the intermediate groundwater encountered MC at non-detectable levels in intermediate wells downgradient of 29WW16, the distance to these wells (29WW14 and 29WW35) is over 600 ft, which is too large to appropriately estimate the extent of MC exceeding the proposed target level range requiring active treatment (500 – 1,500 µg/L). The lateral extent of MC to be remediated is, therefore, highly uncertain and requires additional definition against the target level range before finalizing selection of the remedy. This Work Plan includes a rationale, scope and procedures to perform an investigation of intermediate zone groundwater with the objective to fully define the extent of MC exceeding the target level range.

1.5.3 FS Data Gaps for Intermediate Zone Groundwater MC Plume

In the FS, ISCO using activated persulfate was selected as the preferred technology to treat intermediate zone groundwater where high MC concentrations are suspected. The selection of ISCO was based upon a treatability study using various dosages and activation agents, which led to the selection of heat- and alkaline-activated persulfate as the chemical oxidant. The treatability study indicated that combining heat (to 40 degrees centigrade [deg C]) and alkaline (sodium hydroxide) activation to the persulfate had an estimated efficiency of 48% per treatment event (Shaw, 2010). However, since the FS was issued, a target level range of 500 – 1,500 µg/L has been proposed for active MC remediation within the intermediate zone groundwater. Considering the high concentrations (10,300,000 µg/L) of MC encountered in the center of the plume, which approaches the MC solubility in water (13,000,000 to 20,000,000 µg/L) and indicates the possible presence of MC as a dense non-aqueous phase liquid (DNAPL), the selection of ISCO for the MC plume is being reconsidered based on the following:

- To reduce the MC concentrations from the highest observed concentration of 10,300,000 µg/L (at well 29WW16) to within the target range of 500-1,500 µg/L (a 99.99% reduction) would theoretically require 14-15 injection events assuming all consecutive ISCO events would achieve the 48% efficiency achieved in the laboratory testing.
- Laboratory tests are run under ideal conditions for both temperature control (40 deg C) and mixing of the reagents (caustic and persulfate) with the soil/groundwater sample. These laboratory test conditions cannot be replicated in the field due to heterogeneity of soils, fouling/scaling of the injection wells screens and the surrounding injection zone, and non-uniform heat transfer and incomplete contact of the reagents with the MC, dramatically reducing the efficiency per injection event.

- According to the same laboratory study, removal of heat activation (alkaline activation alone) reduces the efficiency to 6%, indicating that maintaining a constant 40 deg C heating zone is critical to achieving maximum efficiency. This could only be achieved in practice by using an in-situ heat source similar to those used in in-situ thermal treatment technologies.

Additionally, the FS did not consider thermal treatment technologies, (e.g., in-situ thermal desorption [ISTD]) and screened out enhanced in-situ biological remediation (EISB) without conducting treatability tests

The FS did not consider in-situ thermal desorption (ISTD) for the removal/destruction of MC from the high concentration area in the intermediate zone groundwater. However, since this is a technically feasible process that can be implemented at the site, it should be considered and compared to other remedies. ISTD is available through a variety of heating technologies, such as conductive heating, electrical resistance heating (ERH) and steam injection. Due to the prominence of clayey silts and silty clays in the target zone, the expected ability to effectively deliver steam is low, indicating steam injection is not expected to be effective; therefore, steam injection will not be considered in the RI/FS addendum. Both conductive heating and ERH are considered technically viable, but overall cost-effectiveness is highly dependent upon the extent of MC exceeding the target level range.

Although EISB was evaluated in the FS and considered feasible for areas where MC concentrations would be lowered (following ISCO), it was not explored further because it required treatability testing and the appropriate groundwater conditions. EISB will be explored further in this RI/FS addendum through additional data collection, as it may be useful in managing lower MC concentrations that exceed the target level range, but that are too large in extent for ISTD to be cost-effective, and where MNA may not achieve remediation goals within an acceptable timeframe.

Additional plume definition and physical data collection described in Section 3 of this Work Plan are required for conceptual design, technical evaluation and preliminary cost estimates for ISTD and EISB alternatives.

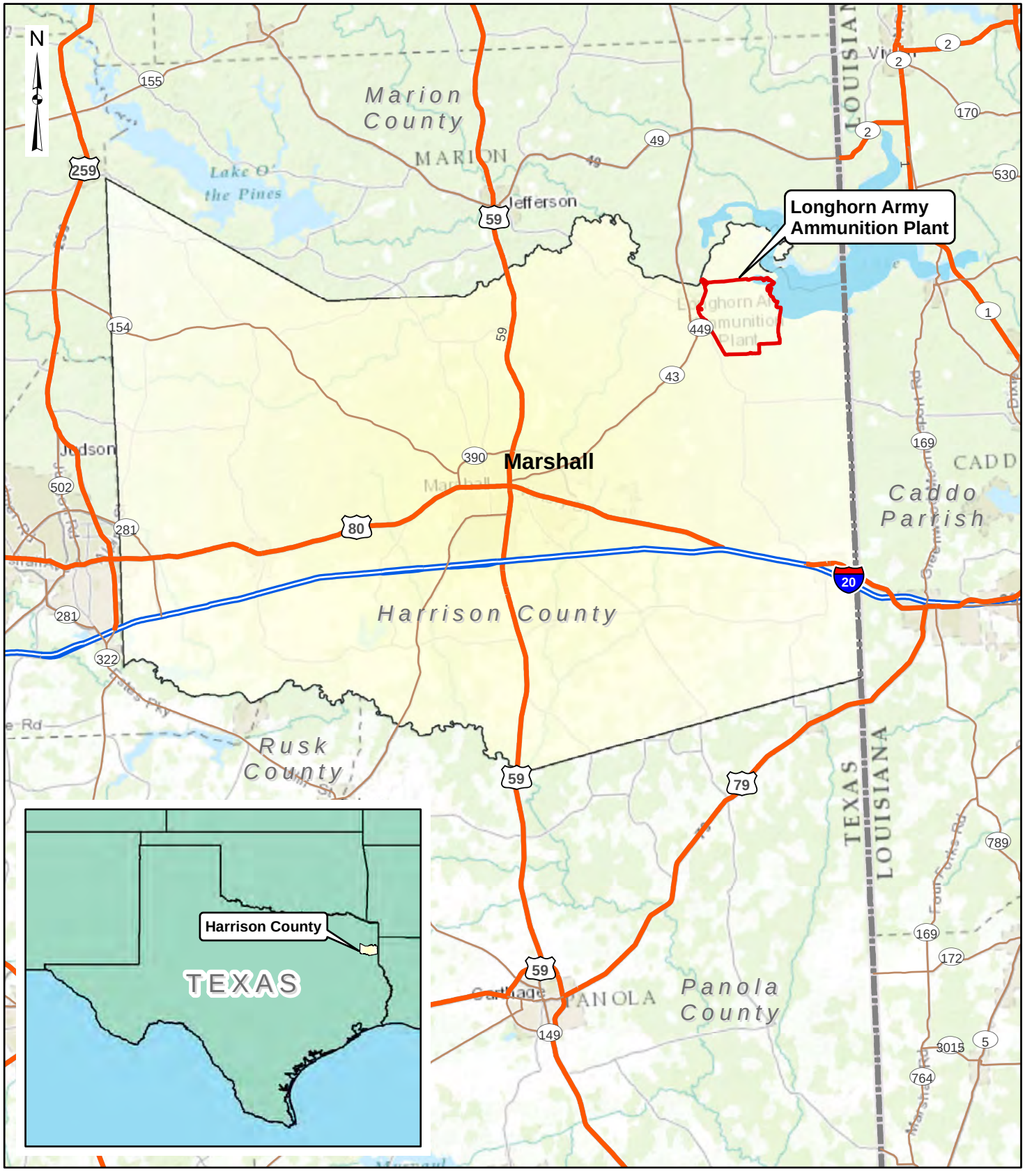

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Figure 1-1
Site Location Map
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

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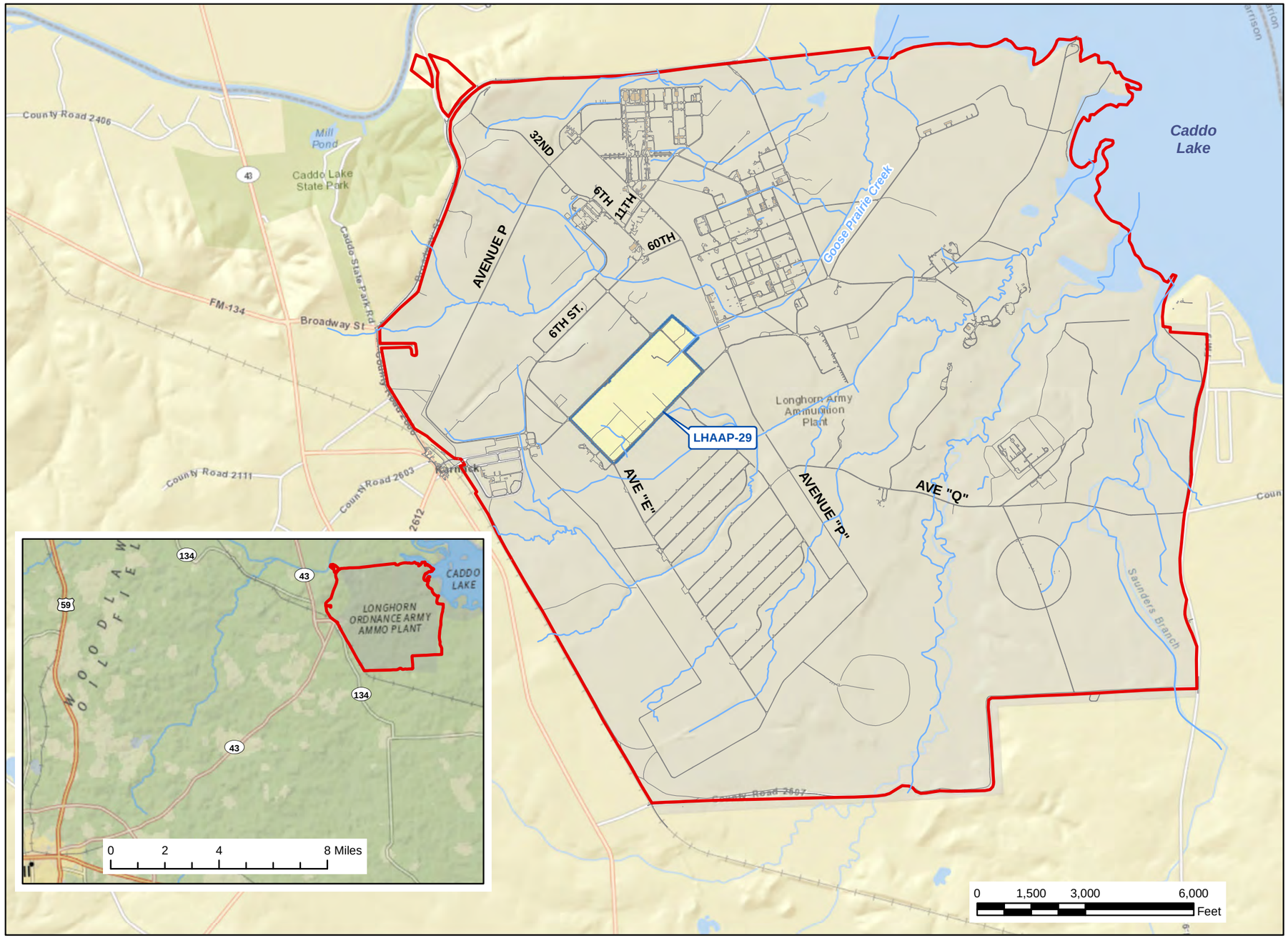
February 2014



N

Legend

- Streams
- Roads
- LHAAP Boundary
- LHAAP-29 Site Boundary
- Lake/Pond

AECOM

Figure 1-2
Site Vicinity Map
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

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- Road
- Railroad
- Process Pipeline
- Fence
- Tree Mass Boundary
- Concrete Slab or Former Building
- Site Boundary

Aerial Photo Source: Bing Maps, 2013

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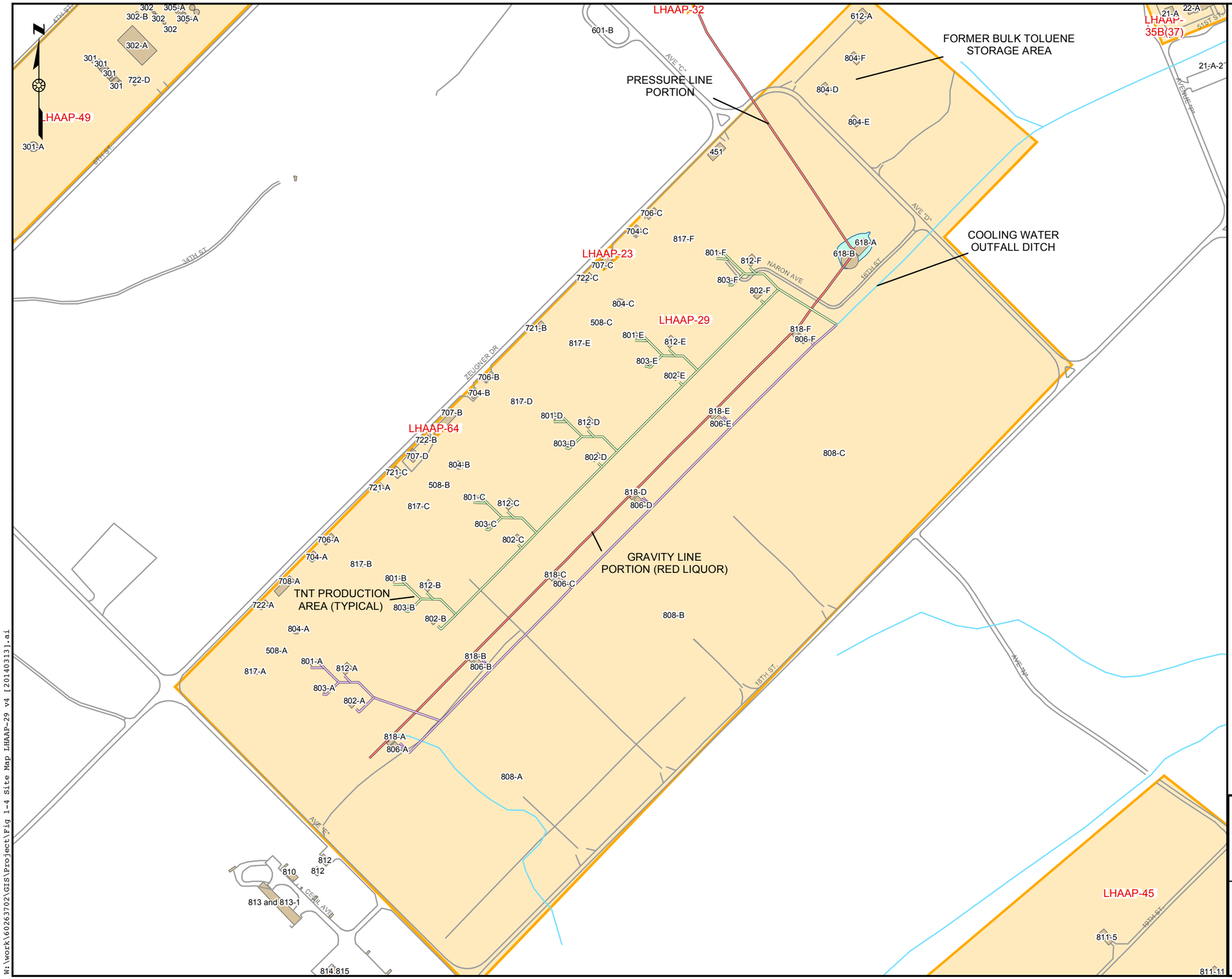
Figure 1-3
Existing Site Features
LHAAP-29

Longhorn Army Ammunition Plant
Karnack, Texas

60263702 February 2014



LEGEND

- TNT Cooling Water Drain Line (South)
- TNT Cooling Water Drain Line (North)
- TNT Wastewater Lines (Wood/Transite)
- Stream
- Road
- Former Building or Concrete Slab
- Pond
- Site

Former Buildings and Structures in or Adjacent to LHAAP-29

Structure or Building Number	Description	Materials Handled
Original Use (1942-1945)		
451	Compressed Air Plant	- - -
508-A to -C	Start-Up Mixed Acid Storage	Acids
612-A	Neutralization House	Cooling water from production (blue water)
618-A	Pump House	TNT waste water (red liquor)
618-B	Wooden Storage Tank	TNT waste water (red liquor)
704-A to -C	Supervisor's Office	- - -
706-A to -C	Solvent Storage Building and/or Powder Magazine	Solvents
707-B to -D	Change House	- - -
708-A	Garage Building	- - -
721-A to -C	Inspector's Office	- - -
722-A to -C	Paint Shop	- - -
801-A to -F	Mono-Nitrating House	Toluene, nitrotoluene, nitric acid, sulfuric acid
802-A to -F	Tri-Nitrating House	Dinitrotoluene, TNT, nitric acid, sulfuric acid
803-A to -F	Bi-Nitrating House	Nitrotoluene, dinitrotoluene, nitric acid, sulfuric acid
804-A to -C	Toluene Working Storage	Toluene
804-D to -F	Toluene Tank	Toluene
806-A to -F	Wash House	TNT, caustic soda, sellite, residual acids, TNT wastewater (red liquor), yellow liquor
808-A to -C	Nail House	TNT, boxes, nails
812-A to -F	Acid & Fume Recovery House	Nitric acid fumes, recovered acid
817-A to -F	Oleum Storage	Oleum
818-A to -F	Barricade	- - -
Subsequent Use		
707-C	General Purpose Warehouse	- - -
801-F	Rocket Motor Soak-Out Facility	Out-of-specification rocket motors containing composite propellants (e.g. polysulfide perchlorate), methylene chloride-based industrial solvent, liquid solvent waste, lubricants, polymers, fuels

- - - Not documented

Reference: Environmental Site Assessment, Phase I and II Report (Plexus, 2004)

Notes:
1. Manholes located along the TNT cooling water drain line.
2. 806 series buildings are wash houses and generated red liquor.

Source: Shaw, 2010, Final Feasibility Study. LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

0 205 410 820 Feet

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Figure 1-4
Site Map
LHAAP-29

Longhorn Army Ammunition Plant
Karnack, Texas

60274185 March 2014

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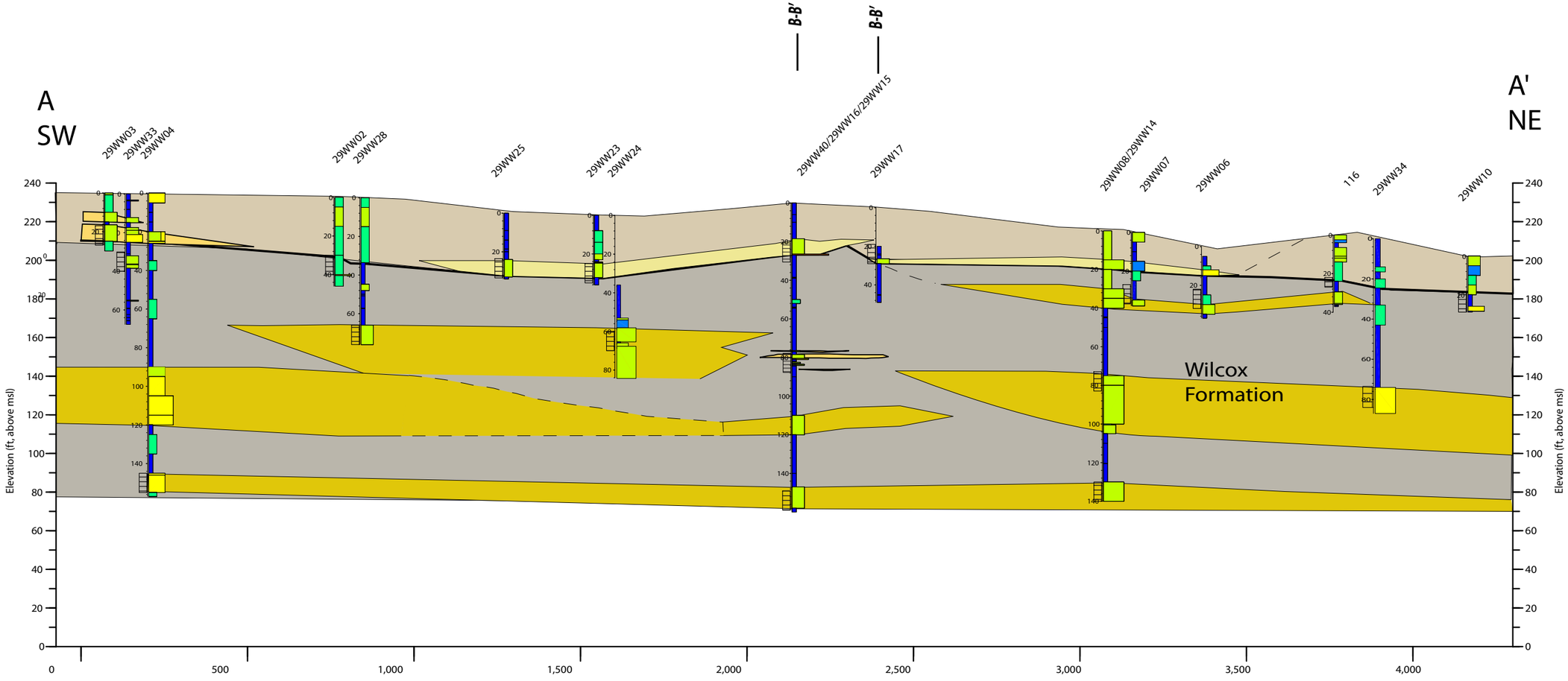

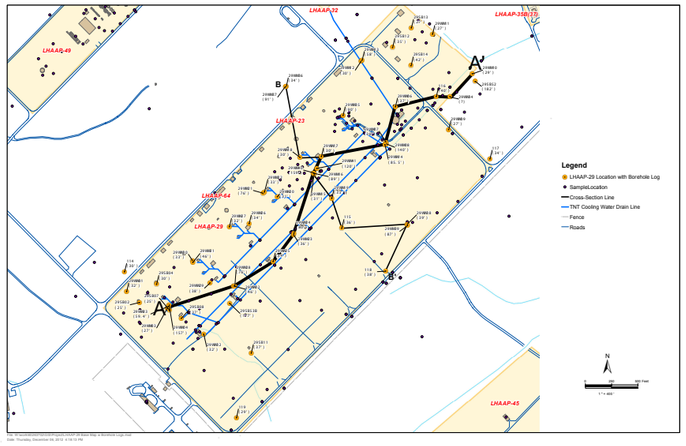

Grain Size Log

- Clay
- Silt-Sandy Silt
- Fine Sand w/fines
- Fine Sand
- Medium Sand w/fines
- Medium Sand
- Coarse Sand w/fines
- Coarse Sand
- Gravel, Sand w/ gravel

Lithofacies

Sand Lithofacies

- Channel and point bar deposits
- Levee and splay deposits
- Wilcox Fm.marine and deltaic sands (Eocene)

Silt/Clay Lithofacies

- Fine overbank deposition (flood plain silts and clays)
- Wilcox Fm.marine and deltaic clays and silts (Eocene)

Down-hole Data Legend

Monitoring Well
Data Explanation

Monitoring Well Screen

Nested wells labeled as follows: Deeper/Shallower

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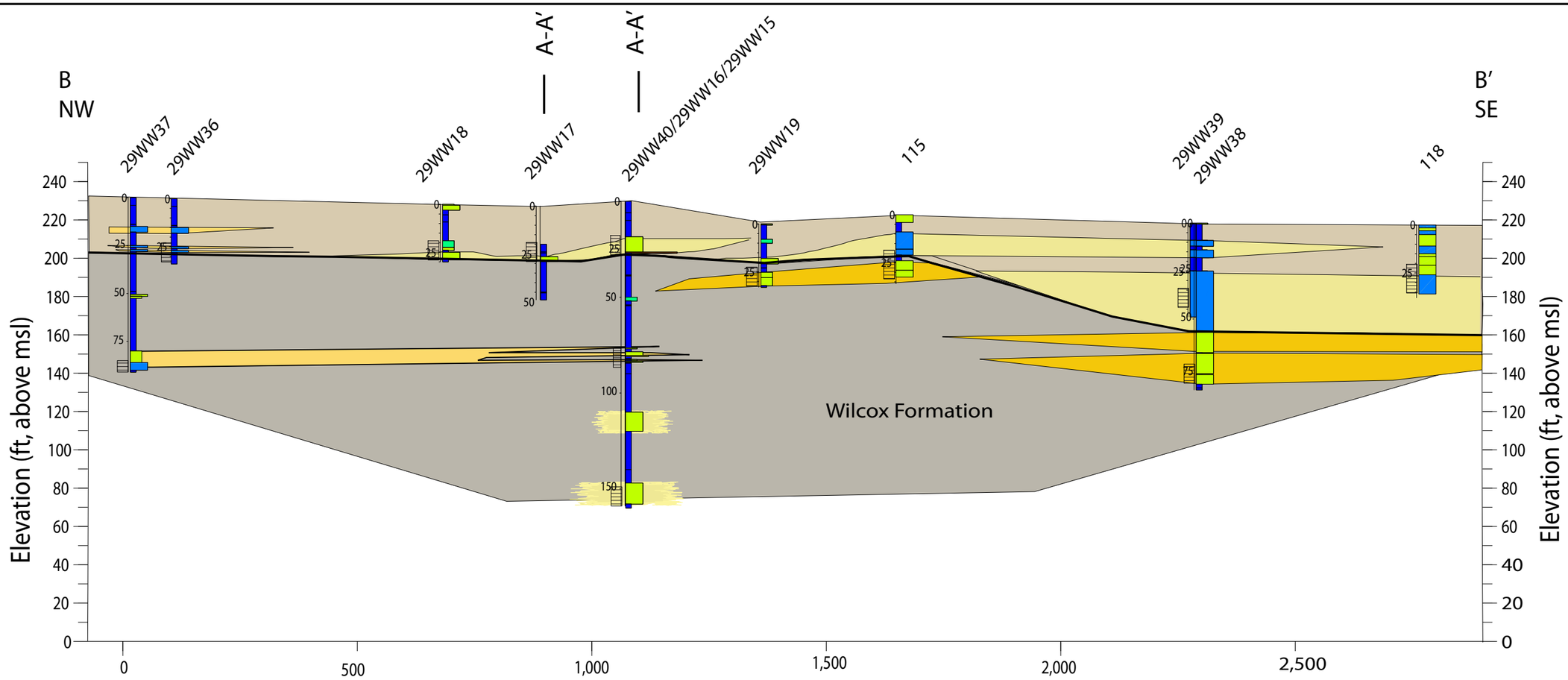
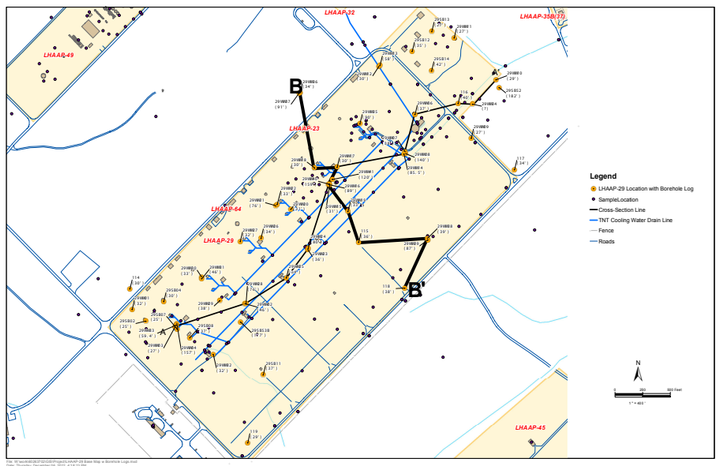
Figure 1-5
Cross Section A-A'
LHAAP-29

Longhorn Army Ammunition Plant, Karnack, Texas

60274185 February 2014





Grain Size Log

- Clay
- Silt-Sandy Silt
- Fine Sand w/fines
- Fine Sand
- Medium Sand w/fines
- Medium Sand
- Coarse Sand w/fines
- Coarse Sand
- Gravel, Sand w/ gravel

Lithofacies

Sand Lithofacies

- Channel and point bar deposits
- Levee and splay deposits
- Wilcox Fm.marine and deltaic sands (Eocene)

Silt/Clay Lithofacies

- Fine overbank deposition (flood plain silts and clays)
- Wilcox Fm.marine and deltaic clays and silts (Eocene)

Down-hole Data Legend

Monitoring Well Data Explanation

Monitoring Well Screen

Nested wells labeled as follows: Deeper/Shallower

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Figure 1-6
Cross Section B-B'
LHAAP-29
Longhorn Army Ammunition Plant, Karnack, Texas
60274185
February 2014

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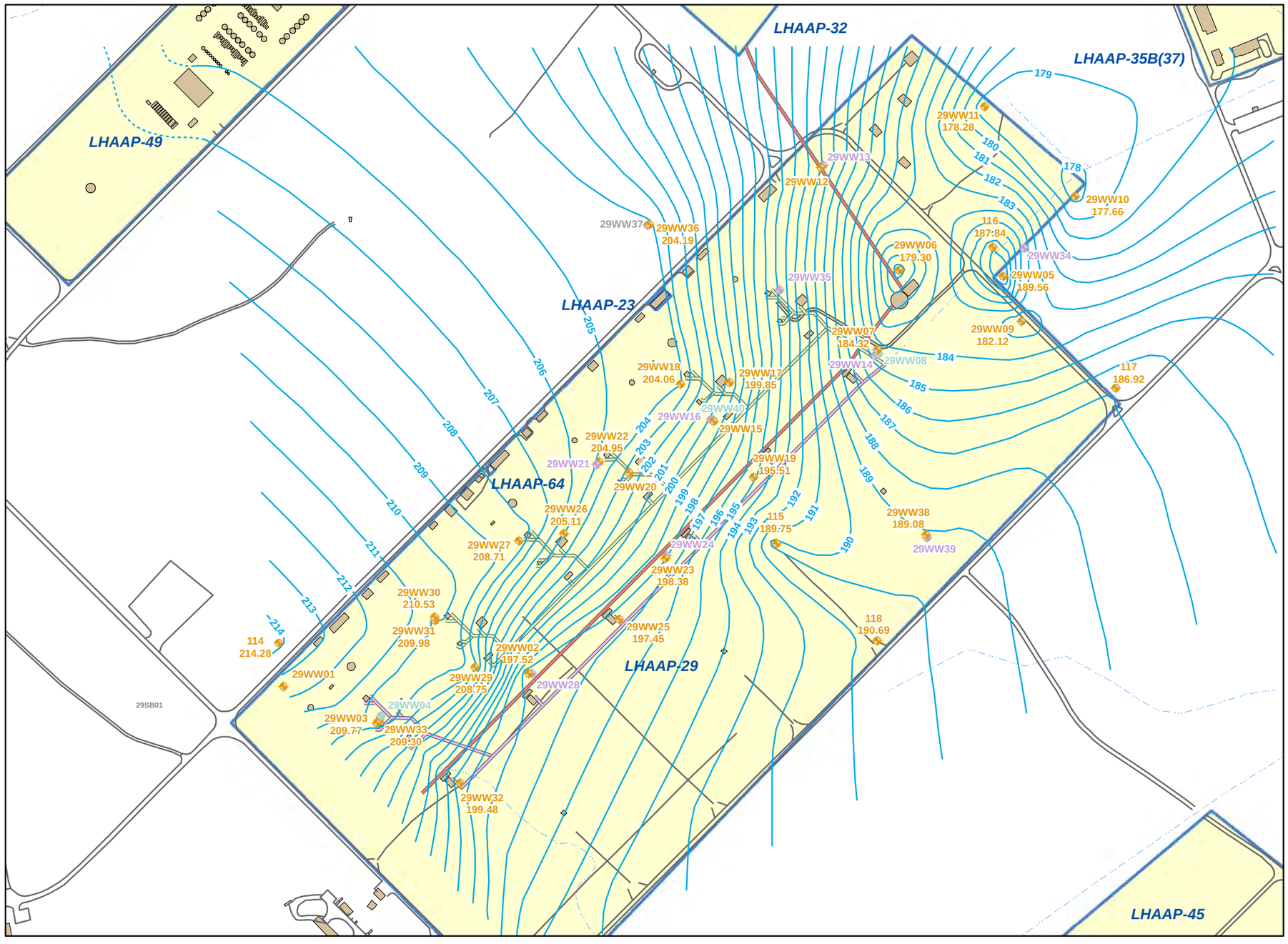

Legend

- Shallow or Lower Shallow Monitoring Well
- Intermediate Monitoring Well
- Deep Monitoring Well
- Groundwater Elevation Contour (Dashed Where Inferred)
- Concrete Slab and Former Building
- Site
- TNT Cooling Water Drain Line (South)
- TNT Cooling Water Drain Line (North)
- TNT Wastewater Line
- Streams
- Roads

Note:
Groundwater contours are based on data collected November 29, 2007 through December 3, 2007.

Source: Shaw, 2010, Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

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Figure 1-7
Groundwater Elevation Contour (Shallow Zone)
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

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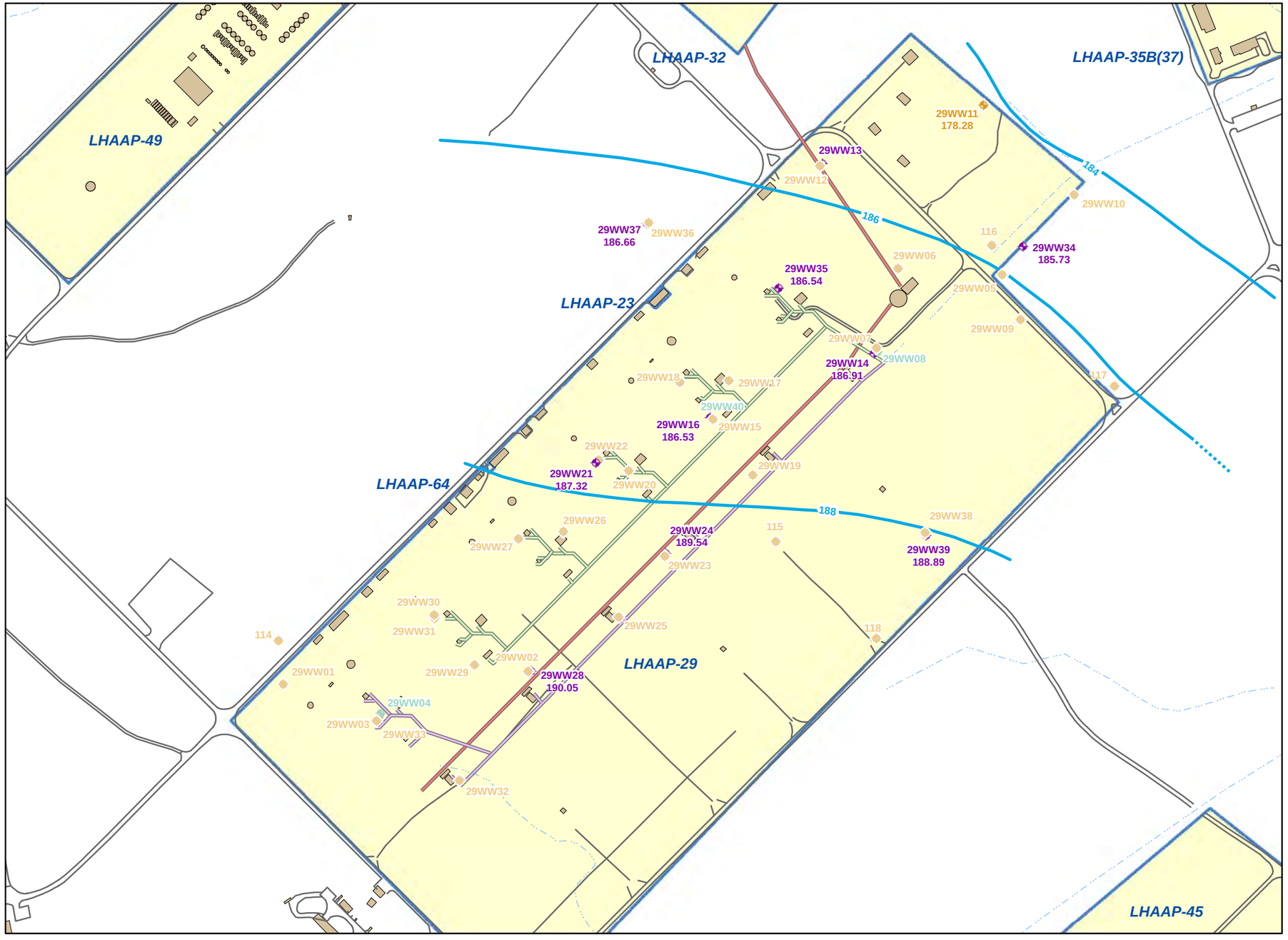
February 2014



Legend

- Shallow or Lower Shallow Monitoring Well
- Intermediate Monitoring Well
- Deep Monitoring Well
- Groundwater Elevation Contour (Dashed Where Inferred)
- Concrete Slab and Former Building
- Site
- TNT Cooling Water Drain Line (South)
- TNT Cooling Water Drain Line (North)
- TNT Wastewater Line
- Streams
- Roads

Note:
Groundwater contours are based on data collected November 29, 2007 through December 3, 2007.

Source: Shaw, 2010, Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

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Figure 1-8
Groundwater Elevation Contour (Intermediate Zone)
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

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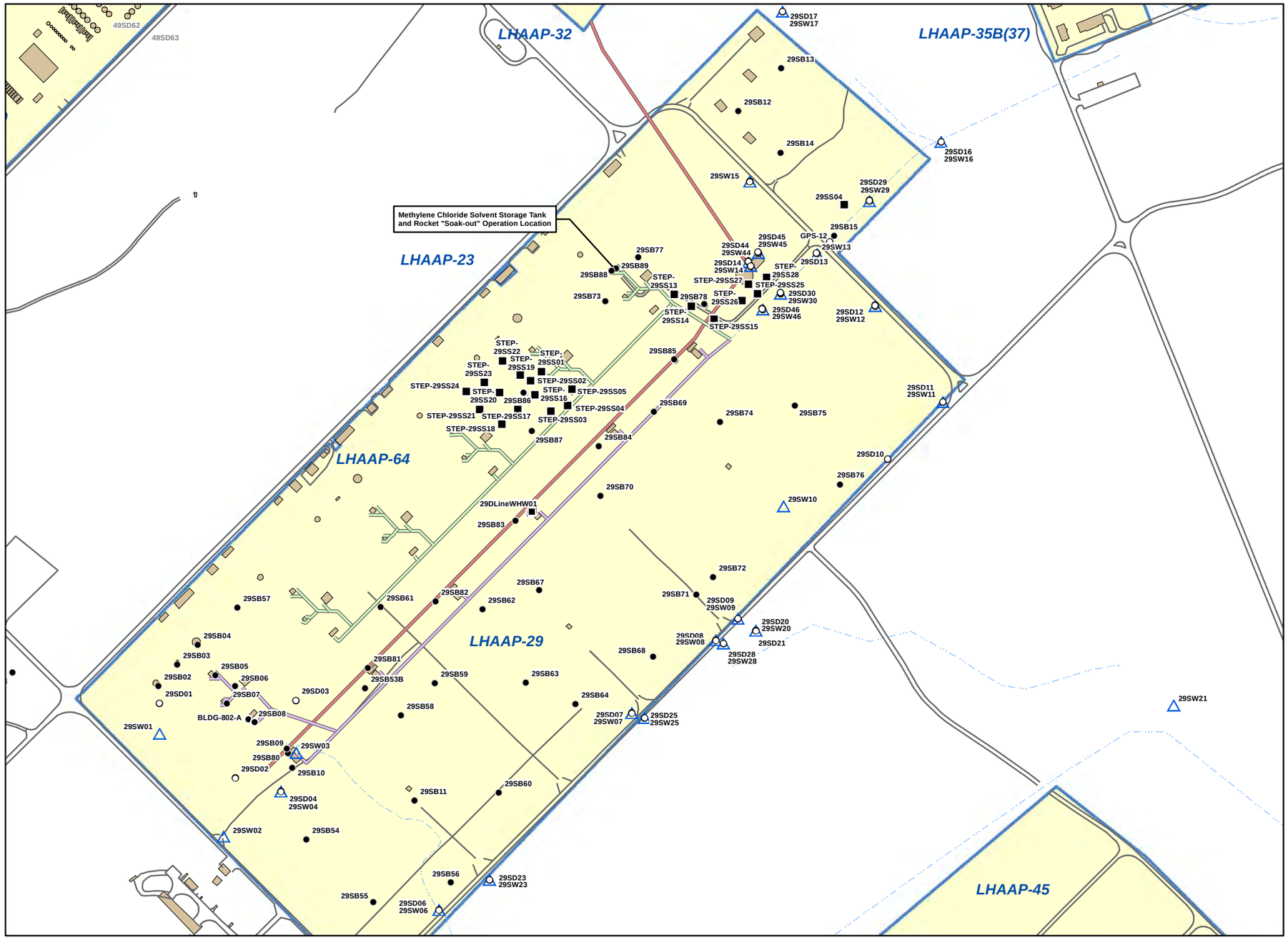
February 2014



Source: Shaw, 2010, Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

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Figure 1-9
Existing Soil and Surface Water Sample Locations
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

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March 2014

Path: L:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-29\2014-Mar-13\Figure 1-9 LHAAP-29 Existing Soil and SW Sample Location Map.mxd

Table 1-1. Summary of Previous Investigations at LHAAP-29*

Pre-Phase I (Jacobs, 2001)

LHAAP Plant Contamination Survey Environmental Protection System, June 1984

- Six monitoring wells were installed and sampled (114 to 119)
- Four surface water and four sediment samples were collected (stations 005-008)
- Eight soil samples were collected within the former TNT production area

Final Remedial Investigation Report for LHAAP, Karnack, Texas, Environmental Protection System, May 1988

- Six groundwater samples were collected from existing monitoring wells
- Thirty-five soil boreholes were sampled at the 0-0.5', 1-1.5', 2-2.5' and 3-3.5' intervals
- Four surface water and four sediment samples were collected

Phase I – Phase III (Jacobs, 2001)

Jacobs, Phase I, 1993

- Eighteen surface water and 18 sediment samples were collected (29SW01-29SW18 and 29SD01-29SD18)
- Seventy-five soil samples were collected from borings 29SB01-29SB15
- Four waste line samples were collected
- Groundwater samples were collected from the existing wells 114-119

Jacobs, Phase II, 1995

- Three surface water and three sediment samples were collected (29SW19-29SW21 and 29SD29-29SD21)
- Forty-four soil samples were collected from borings 29SB53-29SB76
- Four waste line samples and six waste line associated soil samples were collected
- Eleven monitoring wells were installed (29WW01 – 29WW11) and groundwater was collected from each new well and from six existing wells (114-119)

Jacobs, Phase III, 1998

- Ten surface water and ten sediment samples were collected (29SW22-29SW31 and 29SD22-29SD31)
- Fourteen soil samples were collected from borings 29SS01 - 29SS08
- Twenty-two monitoring wells were installed (29WW12-29WW33) and groundwater was collected from each new well and from 17 existing wells (114-119 and 29WW01-29WW11)

Additional Investigations

- Collected 56 soil samples and 72 groundwater samples for perchlorate analysis in 2000 through 2002 (STEP, 2005)
- Soil staining verified TNT through field tests at 2 locations (Plexus, 2005)
- USACE sampling of stained soil (Appendix A, Table A-5)
- Collected 10 soil samples from borings (29SB81-29SB85) for explosives, and 12 soil samples from borings (29SB86-29SB89) for perchlorate in 2004. (Appendix A)
- Collected 8 solid residue samples from manholes and 3 sediment samples from ditches (up through 29SD46) for explosives analysis in 2004. (Shaw, 2007a)
- Installed new monitoring well 29WW34 in 2004. (Shaw, 2007a)
- Collected groundwater samples from 20 wells for explosives, VOCs and perchlorate in 2004. (Shaw, 2007a)
- Collected groundwater samples from 41 wells for explosives, VOCs and perchlorate in 2005. (Shaw, 2007a)
- Collected 3 sediment samples from ditches (29SD47-29SD49), 3 solid residue samples from the transite waste line for explosives analysis, and 1 deep soil sample (29WW40) for VOCs analysis in 2006. (Appendix B)
- Six monitoring wells were installed (29WW35-29WW40) and 15 groundwater samples were collected for volatiles, 11 for general chemistry, and 2 for perchlorate in 2006. (Appendix B)
- Collected 2 groundwater samples from 29WW37 and 29WW39 for VOCs analysis in February 2008. (Appendix B)
- Collected groundwater samples from 5 wells for natural attenuation evaluation (biological, VOCs, explosives, gases, general chemistry) in 2007. (Appendix C)
- Collected 20 additional groundwater samples for metals and VOCs in 2008 (Appendix D)
- Installed new well, 29WW41, in the upper deep zone and sampled the well for VOCs (Appendix D)

*** From Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas**

2 CONCEPTUAL SITE MODEL

The suspected contamination sources at LHAAP-29 consists of explosive compound releases resulting from the manufacturing process of TNT, rocket motor "soak-out" operations at Building 801-F using MC-based solvent, as well as releases from process tanks and process waste pipelines. The pipelines include the TNT process wastewater transite gravity line ("red and/or yellow liquor") that transported the TNT process wastewater to LHAAP-32 for treatment and two cooling water lines (blue water) that transported cooling water to an outfall ditch. The remaining potential primary sources of contamination at the site are the TNT wastewater pipelines and the cooling water lines. Secondary sources include explosives compounds in stained soils around the foundation of Buildings 806-A and 806-D, isolated perchlorate-containing soils in the northeastern portion of LHAAP-29 at a depth of 8 ft bgs, TNT contaminated sediment in the cooling water outfall ditch at a depth of 7 ft bgs and possibly residual MC contamination in soil.

The red liquor TNT wastewater line was originally installed as a wooden pipeline and was taken out of service, clear-flushed and abandoned in 1946 (LHAAP, 1988). The transite TNT wastewater pipeline was added north of the wooden line to carry the TNT wastewater. The transite TNT wastewater line has solid residues contaminated with explosives at concentrations above the GWP-Ind.

Two blue cooling water lines called cooling water line north and cooling water line south exist at LHAAP-29 and range from 8 to 18 inches in diameter. These are gravity fed lines and are constructed of vitrified clay pipe with manholes. These lines have liquid and solid residues contaminated with explosives at concentrations that are above the medium specific concentration (MSC) for industrial use for groundwater (GW-Ind) (liquid) and the (GWP-Ind) (solid residue).

Building 801-F was originally constructed in the early 1940s as one of the mono-nitrating houses. From 1950 to the mid-1970s, out of specification rocket motors were "soaked out" at a tank at Building 801-F using MC based solvent. Waste from this operation was sent to LHAAP-18/24 (Plexus, 2005). Soil samples from the vicinity of Building 801-F in 2000 through 2002 (STEP, 2005) and in 2004 (Shaw, 2010) found some impact of perchlorate and MC, but no risk exceedance was identified.

2.1 Nature and Extent of Contamination

Contamination was found in the soil, groundwater (mainly the shallow and intermediate zones), and water and solid residue remaining in the cooling water and TNT process wastewater underground lines. The COCs include toxic and/or carcinogenic compounds. The contaminants of potential ecological concern (COPECs) may adversely affect the ecological communities. As discussed in Section 2.1.4, the deep groundwater zone at LHAAP-29 is not significantly affected.

2.1.1 Soil

Soil COCs and COPECs are explosives (2,4,6-TNT, 2,4-dinitrotoluene [DNT], 2,6-DNT, 2-amino-4,6-DNT, and 4-amino-2,6-DNT) and perchlorate. **Figure 2-1** shows the approximate areas of contaminated soil. The maximum 2,4,6-TNT concentration in the soil is 26,000 milligrams per kilogram (mg/kg). Other explosives, 2,4-DNT and 2,6-DNT, have a maximum observed concentration of 8,000 mg/kg and an estimated concentration of 15 mg/kg,

respectively. Additionally, perchlorate has been detected in the soil at a maximum concentration of 8.6 mg/kg.

Figure 2-1 presents known soil contamination at LHAAP-29 and approximate areas that were assumed to require excavation (Shaw, 2010). Five areas with COCs and COPECs exceeding their GWP-Ind levels are identified as follows:

- Area in vicinity of 29SB86 with perchlorate as the COC;
- Area in vicinity of 29SD46 with explosives as COCs;
- Stained soil area around Building 806-D (sample location 29DLineWHW01) with explosives as COPECs;
- Stained soil area around Building 806-A with explosives as possible COPECs; and
- 150 ft by 20 ft area around locations 29SD13, 29SB15, and GPS-12 (cooling water ditch north of Avenue D) with explosives as COPECs.

Note that previous soil samples from the stained soil area around Building 806-A (i.e., 29SB10 and 29SB80) did not exhibit contaminant concentrations exceeding GWP-Ind levels. This area was proposed for excavation due to discoloration in the FS (Shaw, 2010) and draft ROD (Shaw, 2011). This Work Plan proposes additional sampling to determine if remediation (e.g., via excavation) of the stained soil is warranted.

2.1.2 Shallow Zone Groundwater

Contamination in the form of explosive compounds, volatile organic compounds (VOCs), perchlorate, and metals is present in the shallow groundwater zone at LHAAP-29 and poses potential risk to the hypothetical future maintenance worker. Shallow zone groundwater COCs are VOCs (MC, 1,1-dichloroethene, 1,2-dichloroethane [DCA], trichloroethene [TCE] and daughter products), perchlorate, explosives (2,4-DNT, 2,6-DNT,).

The shallow zone plumes for explosives based upon most recent sampling events (May 2005) is shown on **Figure 2-2**. The highest concentration of 2,4-DNT detected was 50.9 µg/L at well 29WW05. The highest concentration of 2,6-DNT was 239 µg/L at well 116. The shallow zone plumes for VOCs and perchlorate are shown on **Figure 2-3**. The highest concentrations of TCE and 1,2-DCA detected in the shallow groundwater were 344 µg/L and 5,520 µg/L, respectively, both at 29WW15. The maximum MC concentration detected in shallow groundwater was 8,100 µg/L in 29WW32 (July 1998) near pipelines on the southeast end of the site. The highest concentration of perchlorate detected was 16,800 µg/L at well 29WW15.

2.1.3 Intermediate Zone Groundwater

In the intermediate zone groundwater, concentrations of VOCs and arsenic were detected with MC posing the highest risk based upon most recent sampling events (October 2008). Intermediate zone groundwater COCs are MC, TCE and daughter products, 1,2-DCA, and arsenic. The intermediate zone plume for VOCs based on available data is shown on **Figure 2-4**. The highest concentration of MC detected (10,300,000 µg/L at 29WW16) was approaching the solubility limit (13,000,000 – 20,000,000 µg/L at 20 deg C), which indicates a strong potential for the presence of DNAPL. However, DNAPL or similar concentrations of MC have not been

encountered in nearby shallow zone wells (29WW15, 29WW17, and 29WW18) or in the closest downgradient intermediate zone wells (29WW14 and 29WW36); therefore, the source of this high MC concentration in 29WW16 remains unclear. The former rocket "soak-out" operation which used MC as solvent was reportedly conducted at former Building 801-F, which is approximately 600 ft downgradient of 29WW16. Some low and moderate concentrations of MC were historically detected in soil (29SB07 and 29SB10, up to 28 micrograms per kilogram in May 1993) and shallow groundwater (up to 8,100 µg/L in 29WW32 in July 1998) samples from the southeast end of the site, near the pipelines. It is currently not clear whether MC was somehow transported to these upgradient locations from the original "soak-out" operation location, or undocumented releases of MC occurred in the vicinity of well 29WW16.

Other COCs identified for the intermediate zone groundwater are degradation daughter products of TCE and other chlorinated VOCs that have either not been detected or have not been detected above their Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs); however, due to historic results and the elevated detection limits caused by the high MC concentration in 29WW16, concentrations of 1,2-DCA and TCE may still exceed their SDWA MCLs in this well.

2.1.4 Deep Zone Groundwater

The primary contaminant detected in deep monitoring wells is MC (only other detected contaminants are 2,4- and 2,6-DNTs that were detected once at 8.7 µg/L in 29WW04 in July 1998). Deep monitoring wells near the MC hot spot 29WW16 include 29WW40 (within 10 ft) and 29WW41 (approximately 60 ft downgradient). In 29WW40, MC was detected at the maximum of 215 µg/L in 29WW40 in September 2006, followed by a gradual decreasing trend, and it was not detected in December 2006. In 29WW41, MC was not detected in June 2009 (Shaw 2010). In a further downgradient well 29WW08, MC was detected at the maximum of 2,300 µg/L in July 1998, and it was not detected in the subsequent sampling events. These data indicate that the deep zone groundwater is not significantly affected.

2.1.5 Process Lines

Solid residue COCs from the transite TNT wastewater line are explosives (2,4,6-TNT, 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 4-amino-2,6-DNT). Solid residue contaminated by explosives remains within the transite TNT wastewater line at concentrations above the ingestion standard for industrial use and GWP-Ind, but access to the pipe is limited to the inlets and outlets unless the pipe is penetrated. Additionally, the line is located deeper than the cleanup depth of 2 ft bgs applicable for nonresidential use standards. Based upon visual and physical inspection, the line was reported to be in good condition (LHAAP, 1988).

The wooden TNT wastewater line was flushed and abandoned in the 1940s. The results from soil samples collected near the line indicate there has not been a release to the surrounding soil above the cleanup levels. Further the line is located deeper than the cleanup depth of 2 ft bgs applicable for nonresidential use. Although it was noted in previous site documentation that no additional action is necessary for the wooden TNT wastewater line (LHAAP, 1988), additional soil sampling may result in the inclusion of the wood TNT wastewater line in the flushing and plugging of lines.

Solid residue COCs from the vitrified clay cooling water lines contains explosives (2,4,6-TNT, 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 4-amino-2,6-DNT). The liquid and solid residues from the manholes are contaminated with explosives at concentrations exceeding the MSC for GW-Ind (liquid) and for GWP-Ind (solid residue). The north and south vitrified clay cooling water lines are accessible through manholes, and the liquid and solid residue contents from the manholes were sampled. The results of these manhole samples are presented in the FS report (Shaw 2010).

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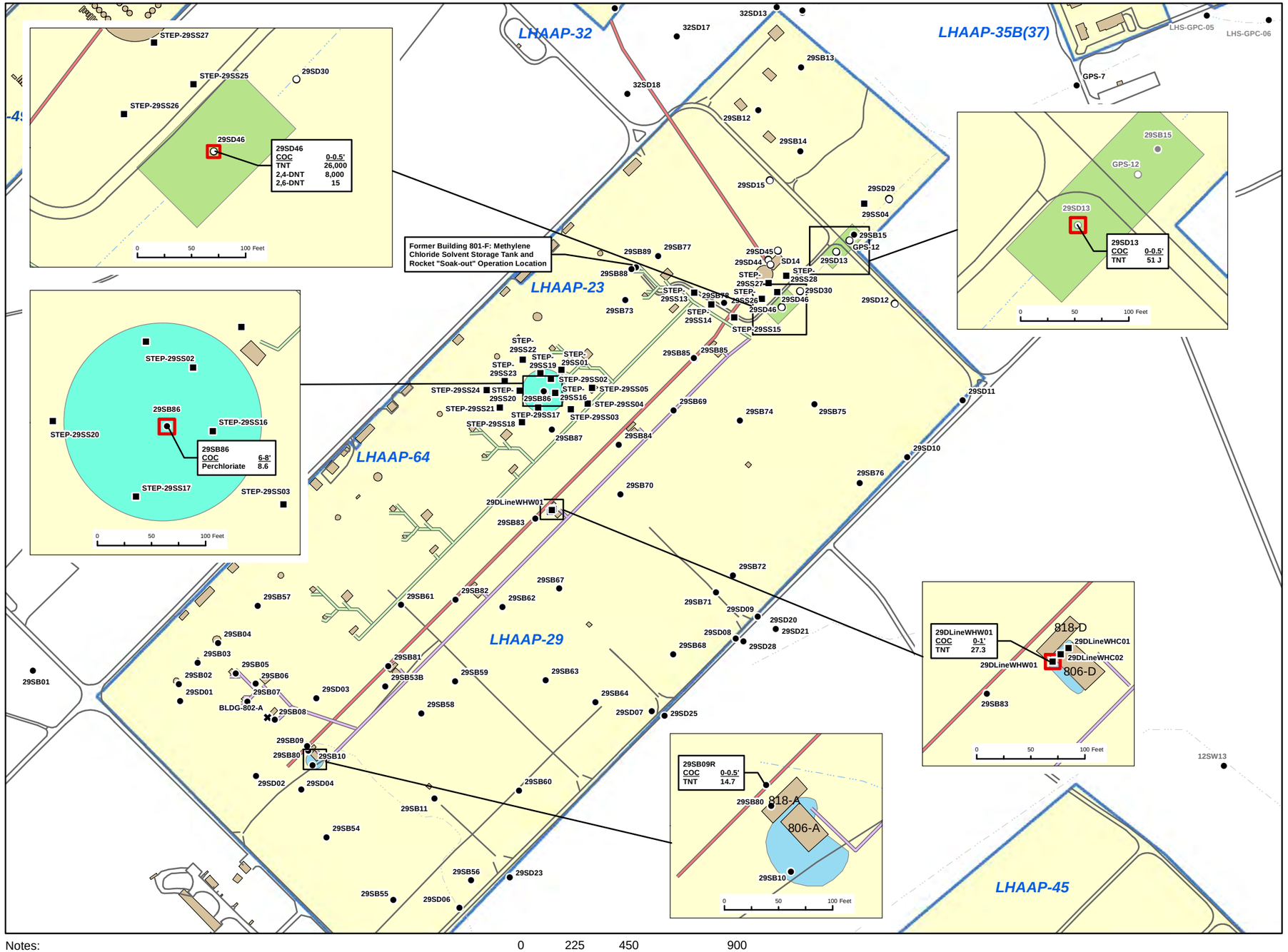


Legend

- Former Building Locations
- Surface Soil
- Soil Boring
- Sediment
- Existing Sample Location with COC Concentrations Exceeding GWP-Ind, unless noted otherwise
- Concrete Slab and Former Building
- Site
- TNT Cooling Water Drain Line (South)
- TNT Cooling Water Drain Line (North)
- TNT Wastewater Line
- Streams
- Roads

Locations of Excavations

- Explosive
- Perchlorate
- Stained Soil (Plexus)

GWP-Ind, unless noted otherwise (mg/kg)	
2,4,6-TNT	4.7 (0-3 ft bgs - See Note 9)
	5.1 (3 ft bgs and below)
2,4-DNT	0.042
2,6-DNT	0.042
2-Amino-4,6-DNT	1.7
4-Amino-2,6-DNT	1.7
Perchlorate	7.2

Source: Shaw, 2010, Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

Notes:
1. Depths are reported in feet below ground surface (ft bgs).
2. Soil sample concentrations in milligrams per kilogram (mg/kg).
3. All COC concentrations shown on this figure exceed their GWP-Ind or ecological risk thresholds.
4. TNT - Trinitrotoluene
5. DNT - Dinitrotoluene
6. COC - Contaminant of Concern
7. ROD - Record of Decision
8. GWP-Ind - Soil medium specific concentration for industrial use based on groundwater protection.
9. TNT target level in 0-3 ft bgs depth interval is the ecological risk threshold of 4.7 mg/kg.

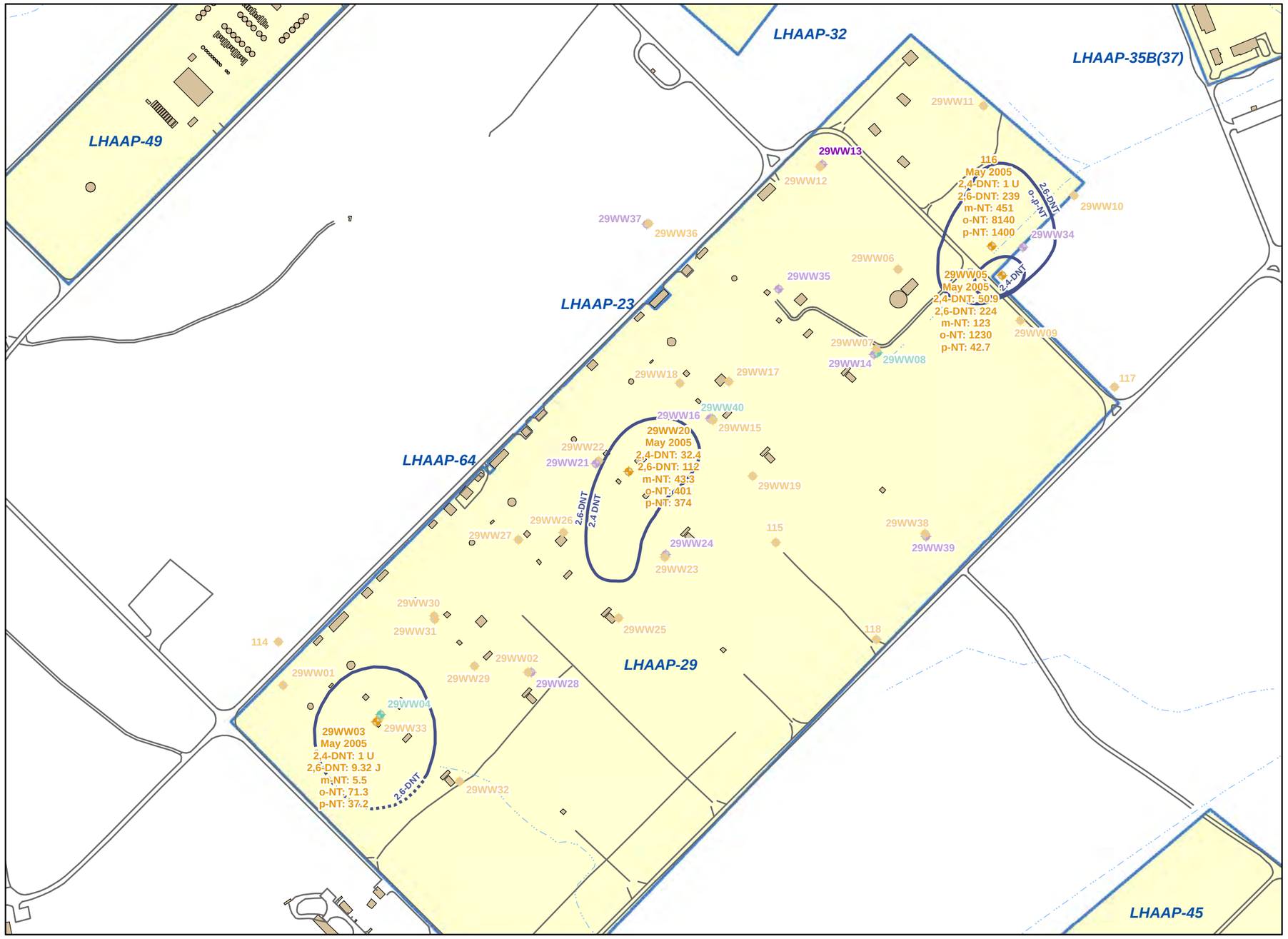
AECOM

Figure 2-1
Soil Contamination and Proposed Excavation Areas
LHAAP-29

Longhorn Army Ammunition Plant
Karnack, Texas

60274185 March 2014

Path: L:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-29\2014-Mar-13\Figure 2-1 LHAAP-29 Soil Contamination Map and Prop Excavation Areas.mxd



0 225 450 900 Feet

Legend

- Shallow or Lower Shallow Monitoring Well
- Intermediate Monitoring Well
- Deep Monitoring Well
- COC Plume (Dashed Where Inferred)
- Streams
- Roads
- Former Building and Concrete Slab
- Site

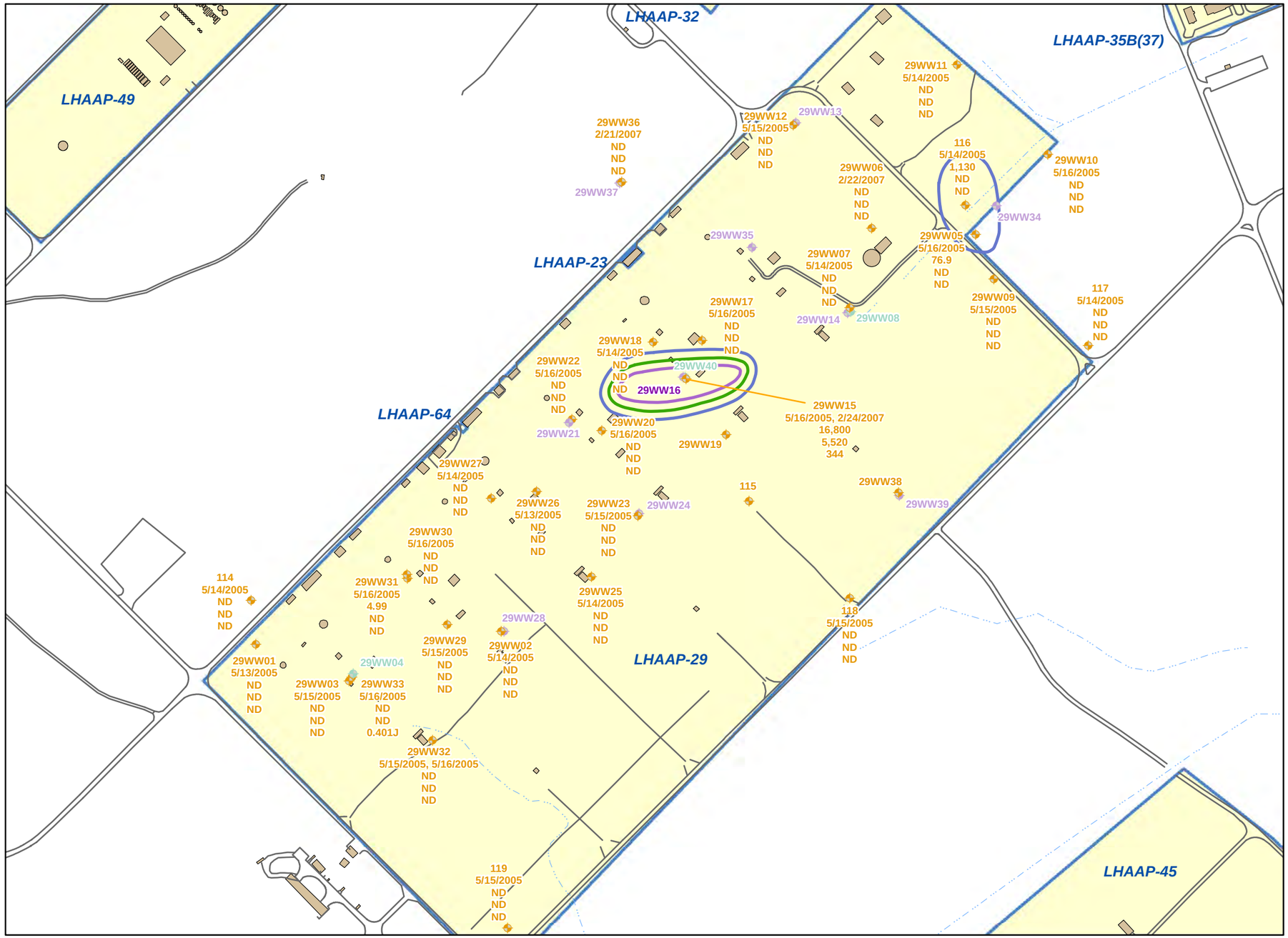
Notes:
1. All concentrations are reported in micrograms per liter (µg/L).
2. COC - Contaminant of Concern
   DNT - Dinitrotoluene
   NT - Nitrotoluene
3. TCEQ GW-Ind - Groundwater MSC for industrial use.

Source: Shaw, 2010, Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

AECOM

Figure 2-2
Explosives Plumes in Shallow Groundwater
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

60274185 February 2014



Legend

- Shallow or Lower Shallow Monitoring Well
- Intermediate Monitoring Well
- Deep Monitoring Well
- Perchlorate Plume in Shallow Groundwater Zone (GW-Ind = 72 µg/L)
- 1,2-Dichloroethane Plume in Shallow Groundwater Zone (GW-Ind = 5 µg/L)
- Trichloroethene Plume in Shallow Groundwater Zone (GW-Ind = 5 µg/L)
- Former Building and Concrete Slab
- Site
- Streams
- Roads

Notes:
1. All concentrations are reported in micrograms per liter (µg/L).
2. ND - Non Detect.
3. TCEQ GW-Ind - groundwater MSC for industrial use
4. MCL = Maximum Contaminant Level.
5. Results listed in this order:
   Perchlorate
   1,2-Dichloroethane
   Trichloroethene

Source: Shaw, 2010, Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

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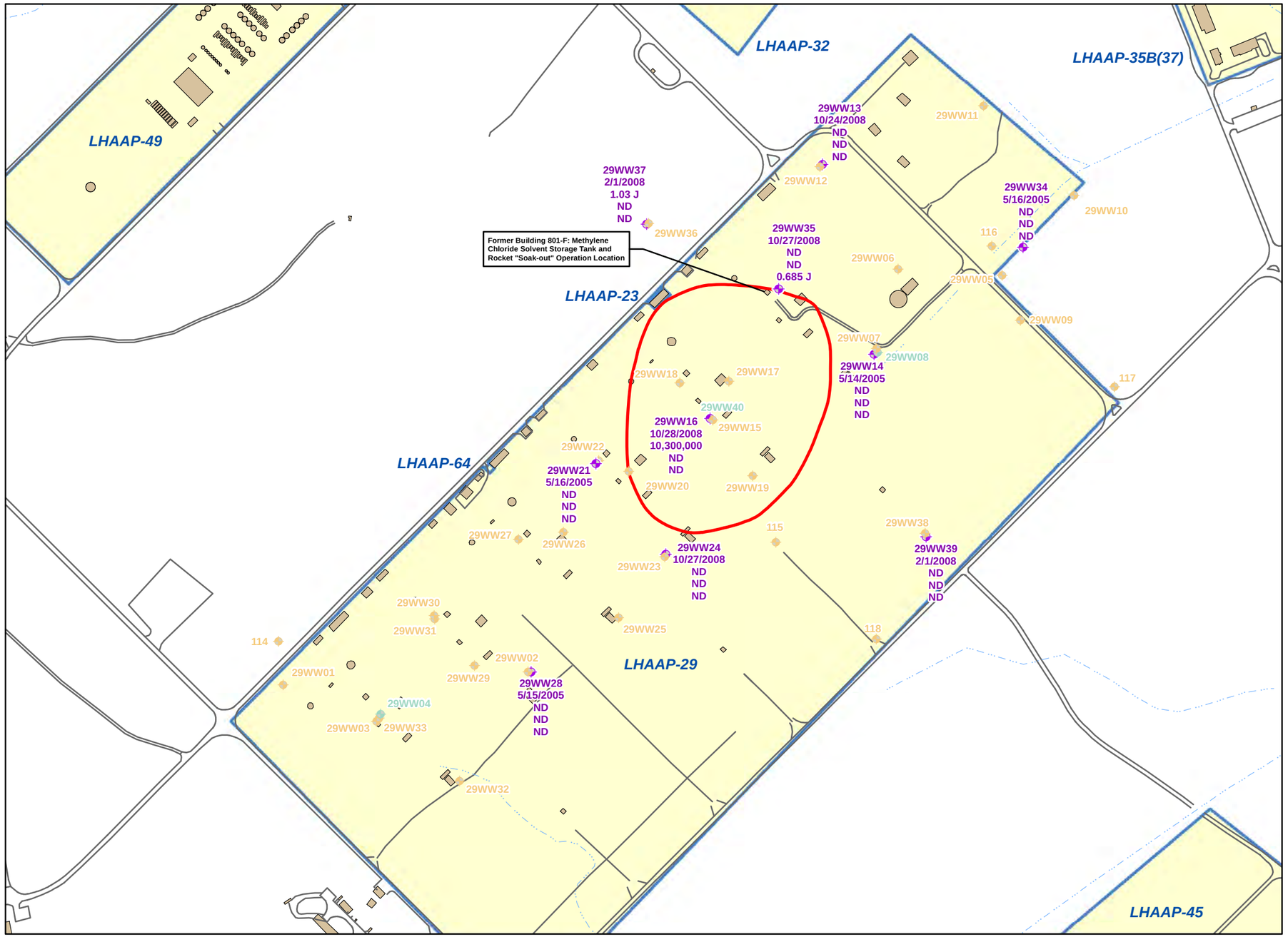
Figure 2-3
VOCs and Perchlorate Plumes in Shallow Groundwater
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

60274185 February 2014



Legend

- Shallow or Lower Shallow Monitoring Well
- Intermediate Monitoring Well
- Deep Monitoring Well
- Methylene Chloride Plume in Intermediate Groundwater Zone (MCL = 5 µg/L)
- Streams
- Roads
- Former Building and Concrete Slab
- Site

Notes:
1. All concentrations are reported in micrograms per liter (µg/L).
2. Results listed in this order;
   Methylene Chloride
   1,2-Dichloroethane
   Trichloroethene
3. ND - Non Detect.
4. MCL - Maximum Contaminant Level.

Source: Shaw, 2010, Final Feasibility Study, LHAAP-29, Former TNT Production Area, Group 2, Longhorn Army Ammunition Plant, Karnack, Texas, April.

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Figure 2-4
VOC Plume in Intermediate Groundwater
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

February 2014

3 PROPOSED ACTIVITIES

3.1 Purpose and Objective

The purpose of the proposed work described in this document is to:

- Conduct a soil gas survey to evaluate VOCs in shallow zone soil within the intermediate zone groundwater MC plume area and in the former Building 801-F area. The results of the soil gas survey will also be used to minimize potential cross-contamination to deeper zones and to assess worker health-and-safety concerns during other invasive investigations proposed in this Work Plan.
- Conduct additional soil sampling as described in **Section 3.2** to further define soil contamination exceeding the GWP-Ind levels, requiring soil removal and off-site disposal;
- Conduct continuous cone penetrometer (CPT) and membrane interface probe (MIP) investigations as described in **Section 3.3** to further delineate the MC plume in the intermediate zone groundwater. The combination of CPT and MIP investigations is referred to as "CPT/MIP investigation" in the remainder of this document.
- Conduct soil resistivity tests to support evaluation of ISTD for the MC plume in the intermediate zone groundwater.
- Conduct aquifer pumping tests in the intermediate zone as described in **Section 3.3**. The main purpose of the aquifer pumping test is to provide hydraulic conductivity data for use in the conceptual design and detailed analysis of ISTD (both conductive heating and ERH). The pumping test results would also support evaluation of EISB of the MC plume.
- Conduct additional treatability tests and stable isotope probing (SIP) bio-trap tests as described in **Section 3.3** to evaluate in-situ bioremediation technologies and the potential biological component for MNA of the MC plume.

Figure 3-1 presents a flow chart summarizing the proposed activities to investigate the MC plume and collect data to further evaluate potential treatment technologies. The activities depicted in **Figure 3-1** are described in more detail in **Section 3.3**.

3.2 Further Characterization of Soil Contamination

Data Gaps

The lateral and vertical extents of impacted soil are not adequately defined to substantiate the extent of soil removal evaluated in the FS. The following data gaps must therefore be addressed:

- Lateral Extent: The existing soil sampling data do not define the soil contamination within the proposed excavation areas evaluated in the FS. More soil sampling between the known "hot spots" and the "clean" sample locations is needed to complete adequately define the lateral extent of soil contamination and the volumes to be excavated for purposes of remedial alternative evaluation. For the purposes of this Work Plan, "hot spots" are defined as sample locations exceeding the GWP-Ind or ecological risk levels for the site as specified in the Draft ROD (Shaw 2011). "Clean" locations are defined as prior sample

locations where COCs were not encountered at concentrations exceeding the GWP-Ind or ecological risk levels. No step-out samples will be obtained once soil contamination has been defined with respect to the GWP-Ind or ecological risk levels for each COC identified in each area during previous investigations. Additional soil data were collected in this area as part of the update to the Baseline Ecological Risk Assessment (BERA). One location previously considered for excavation (29SB08 on Figure 3-3) will not require additional sampling based on the BERA data. In one location near 29SB09 (see Inset 1 on Figure 3-3), an additional location identified as 29SB09R was sampled at the surface and at 0.5 ft bgs for the BERA update. The surface sample result in this location exceeds the GWP-Ind risk level for 2,4,6-TNT and additional lateral delineation by two surficial soil samples have been added in this location.

In addition, soil samples are proposed in the vicinity of well 29WW20 to evaluate if there is soil contamination that contributes to the detection of explosives as COCs in well 29WW20.

- Vertical Extent: The depth delineation of hot spots is incomplete. Soil sampling at deeper intervals is needed to adequately define the depth of soil contamination exceeding GWP-Ind levels for purposes of remedial alternative evaluation.

- Lack of VOC data: Previous soil investigation in the vicinity of 29WW15, 29WW16, and 29WW40 focused primarily on perchlorate distribution (STEP, 2005; and Shaw, 2010). Soil VOC contamination must be further characterized to:
    - Determine if residual MC requiring removal or remediation is present in the soil
    - Evaluate the potential for transporting MC downward into the shallow and intermediate zones during additional groundwater investigation of the intermediate zone as discussed in **Section 3.3**

Proposed Scope

The proposed scope will include a soil gas survey, direct-push technology (DPT) coring and soil sample collection.

The soil gas survey will be conducted at a total of 126 locations within two areas as shown on **Figure 3-2**: 1) in the vicinity of Building 801-F where rocket soak-out operation was conducted, and 2) in the vicinities of previous soil sample location 29SB86 where perchlorate in soil exceeded the GWP-Ind and monitoring well 29WW16 where MC was encountered at high concentrations. Perchlorate contamination originated from rocket motor washing which also involved MC; therefore, the presence of perchlorate in soil may indicate potential MC contamination. The proposed soil gas survey will generally use sampling grids with 20-ft spacing. Denser grids of 10-ft spacing will be used along the process pipelines where leaking or preferential pathways might have occurred, and near monitoring well 29WW16 where the highest concentration of MC was detected in groundwater. Since the release occurred several decades ago and the contamination is expected to have migrated downward over time, the proposed sampling depth is approximately 10 ft bgs. Soil gas samples will be collected with the assistance of DPT drilling using procedures summarized in **Section 4.2**.

DPT coring and soil sample collection will be conducted at 36 locations. The proposed soil sample locations are presented in seven insets on **Figure 3-3**, and summarized in a tabular form in **Table 3-1**. The design of the soil sample locations followed USEPA's *Guidance on Choosing a Sampling Design for Environmental Data Collection* (USEPA, 2002). Based on the site conditions and the purpose of the soil sampling activity, a judgmental sampling design strategy is utilized for selection of the soil samples at LHAAP-29.

The proposed soil sample locations are based on hot spots and clean locations in six subareas which, for discussion purposes, are referred to as insets to be consistent with **Figure 3-3**:

- Inset 1: Stained soil near building 806-A. TNT concentration exceeded GWP-Ind in soil at 29SB09R (near 29SB09, see Inset 1 on Figure 3-3) at the surface during the BERA update in 2013. Two locations, 29SB90 and 29SB91 are proposed along the TNT wastewater line, at a step-out distance of 20 ft. Near building 806-A, soil concentrations from previous samples, including 29SB10 and 29SB80, did not exceed the GWP-Ind or ecological risk levels. However, the area near building 806-A was proposed for excavation in the FS due to the presence of discolored surficial soil (Shaw, 2010). Two random soil sample locations, 29SB92 and 29SB93, are proposed to further evaluate the potential for soil contamination in this area and to confirm the need for excavation.
- Inset 2: Previous explosives concentrations in soil at 29DLineWHW01 exceed ecological risk criteria. Two closely spaced samples, 29DLineWHC01 and 29DLineWHC02, appear to be clean. A relatively small step-out distance of 20 ft is used for three proposed soil sample locations 29SB94 through 29SB96. No step-out sample is proposed to the northeast as clean samples 29DLine WHC01 and 29DLineWHC02 already exist.
- Inset 3: Explosives were detected in groundwater from shallow monitoring well 29WW20 in 2005. Four new soil sample locations, 29SB97 through 29SB100, step out from well 29WW20 at a distance of 30 ft to evaluate whether soil contamination that could impact groundwater remains present in the vicinity of 29WW20.
- Inset 4: Previous perchlorate concentrations in soil at 29SB86 exceed GWP-Ind. High concentrations of MC were also detected in the monitoring wells (29WW15 and 29WW16) approximately 140 ft east of 29SB86. Seven new soil sample locations are proposed with an inner circle of sample locations at a step-out distance of 20 ft (29SB102, 29SB104 through 29SB106), and an outer circle at a step-out distance of 40 ft (29SB101, 29SB103, 29SB107). No step-out sample is proposed to the east on the outer circle as that location coincides with a clean sample collected at STEP-29SS16. Soil samples from the three outer circle step-out locations will be placed on hold for contingent analysis. The actual soil sample locations in this area may be adjusted based on the soil gas survey results.
- Inset 5: Previous explosives concentrations in soil at 29SD46 exceed human health risk criteria. Four new sample locations, 29SB109 through 29SB112, are proposed using step-out distance of 30 ft. Two additional sample locations, 29SB108 and 29SB113, are proposed along the direction of the pipeline, stepping out 30 ft from 29SB109 and 29SB112, respectively, with analysis of these soil samples contingent on results from 29SB109 and 29SB112.

- Inset 6: Previous explosives concentrations in soil at 29SD13 exhibited a tentative detection (51J mg/kg TNT) that exceeded human health risk criteria. Four new sample locations, 29SB114 through 29SB117, are proposed using step-out distance of approximately 30 ft.

The proposed sampling depths for all new locations are from the zones where contamination was detected based on data from previous samples (**Figure 3-3**). In addition, the follow depth intervals are proposed:

- For area shown in Inset 4, a previous sample from 6-8 ft bgs showed perchlorate exceedance of GWP-Ind. Soil samples from 6-8 and 8-10 ft bgs will be collected. In addition, soil samples at 10-12 ft bgs will be collected for contingent analysis.
- For areas shown in the other 5 insets, soil samples will be collected from 2-4 ft bgs in addition to the depth interval where previous exceedance of GWP-Ind or ecological risk levels was detected or where shallow groundwater shows elevated explosive concentrations (29WW20). Analysis of soil samples from 2-4 ft bgs will be contingent based on detection of contamination at shallower depths.

The proposed sampling locations and depth intervals are approximate based upon currently available data, and are to serve as general guidance. The actual sampling location and depth may be adjusted based on subsurface or surficial interferences or field observations such as soil staining. The methods of soil and groundwater sampling are presented in **Section 4.2**.

3.3 Further Characterization and MC Plume-specific Treatability Data Collection

Figure 3-1 presents a flow chart of the proposed additional characterization and data collection to support evaluation of remedial technologies not (fully) considered in the FS to address the MC plume in the intermediate zone groundwater, which will include:

- Additional investigation of the MC extent in the intermediate zone in the vicinity of 29WW16, including a CPT/MIP investigation, soil sampling and installation of additional intermediate zone groundwater monitoring wells. This objective of this investigation is to complete definition of the intermediate groundwater MC plume exceeding the target level range and establish the boundaries for active treatment.
- Soil resistivity and total organic carbon (TOC) tests to evaluate the feasibility and cost of ISTD through conductive heating or ERH.
- An aquifer pumping test to determine the hydraulic conductivity in the target zone, which is needed to evaluate the scope and cost of plume control during ISTD.
- MC-specific bio-trap tests to evaluate the potential of EISB and the biodegradation component of MNA.

The data collected above will allow a holistic evaluation of remedial technologies for the intermediate zone groundwater MC plume not included in the FS, such as ISTD, or not fully evaluated in the FS, such as EISB. The selected remedial alternative in the FS was “Alternative 2”, consisting of Excavation and Off-site Disposal for Soil; Plug Lines; In-Situ Chemical Oxidation for Intermediate Zone Groundwater; MNA and LUC (Shaw, 2010). It is anticipated that ITSD, possibly combined with EISB for polishing, will replace the ISCO component as the

remedy for the intermediate zone groundwater plume where concentrations exceed the MC target level interval, while MNA would address residual concentrations less than the target level interval.

The following sections provide more detailed discussions of the data gaps and the proposed activities to address them.

3.3.1 Plume Characterization Data Gaps

Data Gap

- MC concentration in the last sampling event in 2008 was 10,300,000 µg/L in one intermediate monitoring well 29WW16, and the closest data available within the intermediate zone is less than 0.25 µg/L measured in 29WW35, which is approximately 600 ft downgradient from 29WW16. The lateral extent of the intermediate zone MC plume is therefore not adequately defined to select and design the appropriate remedy.
- At the shallow monitoring well 29WW15, which is co-located with 29WW16, the historical MC data did not exceed 100 µg/L since 1998, which were five orders of magnitude lower than that in 29WW16 in 2008. The mechanism of how MC was transported from a release point at or near the surface to the intermediate zone is currently not well understood.

Proposed Scope

The proposed scope will include CPT to collect stratigraphic data, MIP measurements to determine the relative distribution of volatile COCs, and soil and groundwater sampling to finalize interpretations of potential contaminant transportation mechanism and overall contaminant distribution. Dependent upon the results of the CPT/MIP investigations, up to three permanent (multiple screen) monitoring wells will be designed and located within strategic locations in the vicinity of 29WW16. The specific scope proposed for the MC plume in intermediate zone groundwater is described below, in **Table 3-2**, and on **Figures 3-1, 3-2**, and **3-4** through **3-6**.

A total of 11 CPT/MIP locations, 29CPT01 through 29CPT11, are proposed within the suspected groundwater plume, to better delineate the horizontal and vertical distribution of chlorinated VOCs (MC, 1,2-DCA, and TCE) and to collect lithology data. The presence of concentrated source areas and/or DNAPL within a soil column can be indicated by MIP measurements and subsequently confirmed with directed sampling.

The CPT/MIP investigation of the MC plume will start with four locations near intermediate well 29WW16 where over 10,000,000 µg/L was detected in 2008. Proposed location 29CPT01 will be approximately 60 ft upgradient from 29WW16, and proposed locations 29CPT02 through 29CPT04 will be in a radiating pattern approximately 100 ft downgradient from 29WW16. The results of the proposed shallow soil gas survey discussed in **Section 3.2** will also be used to guide the locations of these four CPT/MIP locations; if the soil gas survey indicates high VOC concentrations, the CPT/MIP locations will be moved to minimize the potential penetration of a VOC hot spot in the shallow zone.

The other seven CPT/MIP locations will be determined depending on the real-time MIP result during field investigation. Intermediate monitoring wells 29WW16, 29WW37, 29WW35 and 29WW14 with available groundwater data in the last sampling event (2008) will be used as reference points; 29WW16 is considered a "hot spot", and 29WW35, 29WW37, 29WW14 are considered "clean spots". If one CPT/MIP location shows a very low MIP signal, then the next location will be the midpoint between a hot spot and the location with the low MIP signal. For example, if 29CPT02 has a very low MIP signal, then 29CPT05 will be located at the midpoint between 29CPT02 and 29WW16; if 29CPT03 gives high MIP readings, then 29CPT06 will be placed between 29CPT03 and 29WW35, depending upon the MIP signal strength at 29CPT03. **Figure 3-2** represents the assumed overall extent of the CPT/MIP investigation. The decision rules of the contingent CPT/MIP locations are presented in a flow chart on **Figure 3-4**. Note that a MIP reading exceeding the upper limit of the MIP detector before reaching the intermediate zone (approximately 50 ft bgs) will trigger termination of investigation at that location to avoid carryover of contamination into deeper zones. The CPT/MIP investigation methods are described in **Section 4.3**.

In addition, the following activities will be conducted following the CPT/MIP investigation, as summarized in **Table 3-2:**

- *MIP versus VOC concentrations in soil and groundwater:* Since the MIP data is semi-quantitative for VOCs, discrete soil and groundwater samples will be collected at up to four CPT/MIP locations (likely 29CPT01 through 29CPT04) using direct push technology, coinciding with selected MIP boreholes to establish an order of magnitude correlation between the MIP response curves of VOCs and laboratory analytical results. Direct push soil and groundwater sampling procedures are presented in **Section 4.2**.
- *Monitoring well installation:* Up to three intermediate monitoring wells will be installed near the locations with high MIP readings. For illustration purpose, **Figure 3-2** shows the proposed monitoring well locations at 29CPT02 through 29CPT04. Continuous soil coring and logging will be conducted during well installation for comparison to the CPT results.

Figures 3-5 and **3-6** present the proposed CPT/MIP locations on the cross-sections and illustrated how the proposed CPT/MIP locations relate to the lithologic framework based on currently available data. The CPT/MIP data and groundwater monitoring well boring logs will be used to update the lithologic framework for the target area using environmental sequence stratigraphy. The stratigraphic framework will be used to evaluate the existing groundwater chemistry and hydrogeology data to create a hydrostratigraphic model and define individual hydrostratigraphic units. Tools to assess groundwater flow patterns include well cluster correlation of hydrographs, concentration trends, and vertical gradients.

3.3.2 Treatment Technology Data Gaps

Data Gap

In addition to defining the nature and extent of the MC plume discussed in **Section 3.3.1**, the development of conceptual designs, feasibility analysis and cost estimates for the ISTD technology options (conductive heating and ERH) require site-specific data on the following parameters in the target zone: electrical resistivity, TOC and hydraulic conductivity. EISB requires a site-specific determination of the presence of microorganisms capable of degrading

MC and whether these can be enhanced under aerobic or anaerobic conditions. As discussed below, arrays of in-situ microcosms are proposed to evaluate the viability of EISB for the MC plume. Assuming EISB is considered potentially viable based on the in-situ microcosm testing, field testing will be required during the remedial design phase to determine whether the microbe populations can be sufficiently enhanced in-situ to polish the residual MC concentrations following ISTD.

Proposed Scope

Following outlines the proposed treatment technology parameter testing to be performed under this Work Plan. Detailed procedures for the proposed testing are included in **Sections 4.5 through 4.8**.

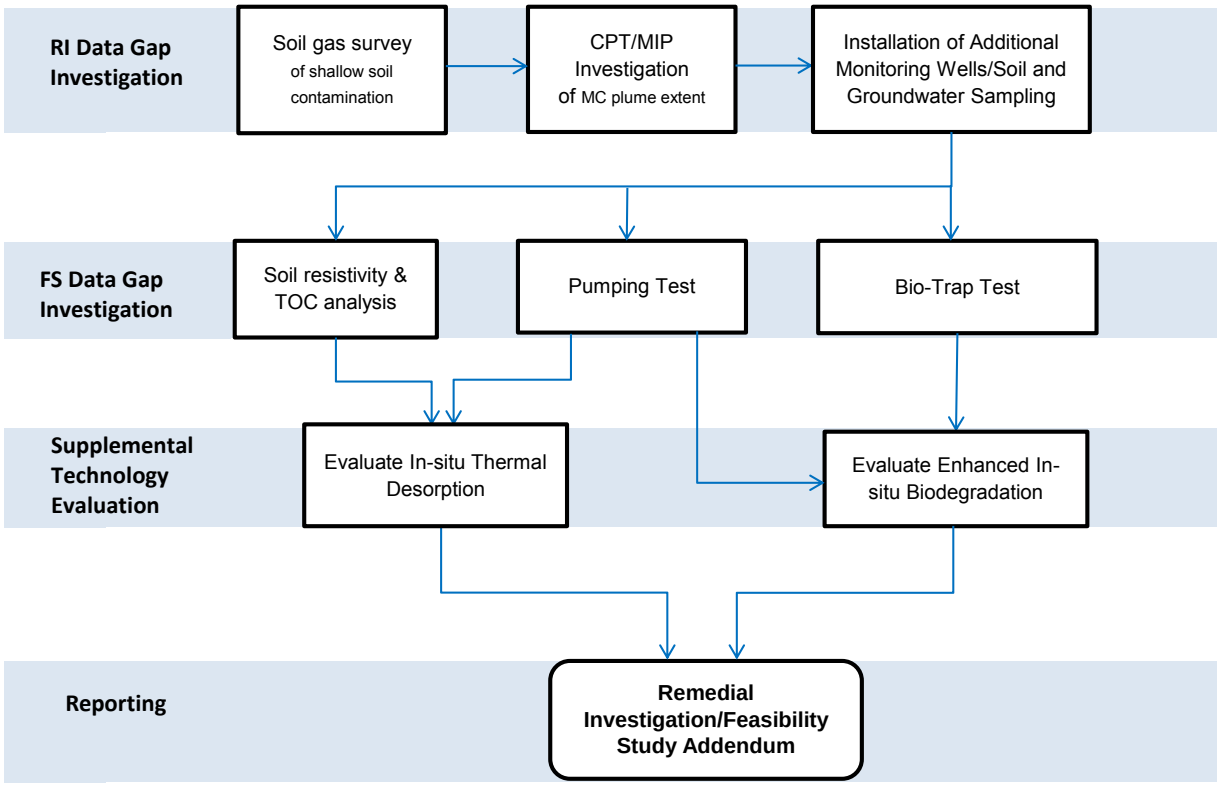
- *Electrical resistivity testing and TOC analyses:* Up to three soil cores and a groundwater sample will be submitted for electrical resistivity testing and TOC analyses at each location where monitoring wells are to be installed to evaluate the potential ISTD for treatment of the MC hot spot in intermediate zone groundwater. The three soil cores from each location will represent significantly different lithologic intervals. The results of these discrete soil resistivity tests will be compared with the electrical resistivity logs obtained during the CPT investigation.
- *Aquifer pumping test:* The various ISTD technology options to be evaluated in the RI/FS Addendum will involve groundwater extraction from the intermediate zone. For example, during ISTD implementation (whether using conductive heating or ERH) groundwater extraction is required to control the plume and draw down the intermediate groundwater to allow removal of MC via vapor extraction. The aquifer characterization performed during the RI included slug tests in the monitoring wells (Jacobs, 2001). Slug tests provide very limited information on the hydraulic properties of the aquifer and often produce estimates which are only accurate within an order of magnitude (USEPA, 1993). The performance of a location-specific aquifer pumping test will provide better estimates of hydraulic conductivity, pumping rates, well spacing and expected drawdown within the treatment zone. In addition, an aquifer pumping test will provide essential information on the interaction (if significant) between the intermediate and shallow zones by placement of transducers in both zones. Well 29WW16 is expected to be used as a pumping test well, with the three new (multiscreened, if applicable) monitoring wells and existing shallow zone monitoring well 29WW15 used as observation wells (**Figure 3-2**). Depending on the vertical extent established during the CPT/MIP testing, an additional extraction well may be proposed to ensure coverage of the entire contaminated depth interval. The aquifer pumping test procedure is presented in **Section 4.5**.
- *In-situ microcosm array testing:* The intermediate zone groundwater plume showed some natural attenuation (primarily biodegradation) capacity as indicated by historical data trend and evaluated in the MNA report included in the FS (Shaw 2010). However, it remains unclear whether the primary biodegradation mechanism is via aerobic or anaerobic pathway, and whether the biodegradation process can be enhanced to remediate the groundwater plume. In-situ microcosm array testing is therefore proposed to evaluate the occurrence and extent of biodegradation in the intermediate zone groundwater plume. The microcosm array test will use Bio-Trap with SIP to identify the responsible

microorganism populations. Bio-Traps will be deployed in two wells: 29WW16 with high levels of MC, and another well (either 29WW42, 29WW43 or 29WW44) with moderate levels of MC, to evaluate the impact of MC levels on biodegradation activity. Each well will house three Bio-Trap units to test biodegradation of MC under natural conditions (no substrate amendment), anaerobically enhanced conditions (amended with emulsified vegetable oil [EVO]), and aerobically enhanced conditions respectively (amended with oxygen release compound [ORC®]). In-situ microcosm test method is summarized in **Section 4.6.**

3.4 Preparation of RI/FS Addendum

RI for soil described in Section 3.2 and intermediate zone groundwater described in Section 3.3, as well as the testing data and detailed evaluation of ISTD and EISB (Section 3.3), will be documented in a combined RI/FS Addendum. Once the RI/FS Addendum has been finalized and approved, the existing Proposed Plan will be updated with the selected remedy in the RI/FS Addendum and issued for public comment. Once the Proposed Plan has been accepted, the draft ROD (Shaw, 2011) will be updated and completed.

Figure 3-1
Flow Chart of RI and FS Data Gap Investigations for Methylene Chloride Plume

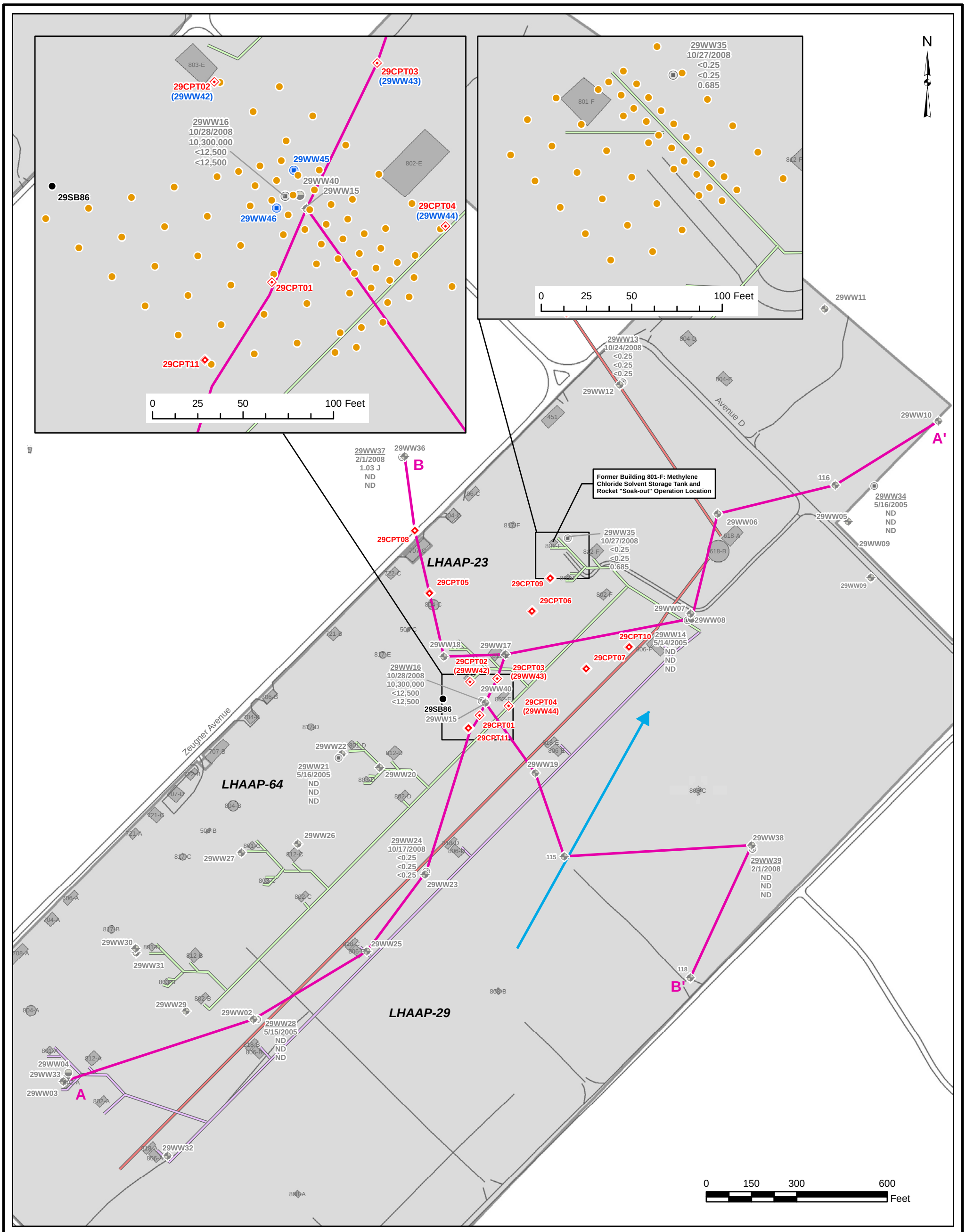


Legend:

Activity

Deliverable

Notes:
RI -- Remedial Investigation
FS -- Feasibility Study
MC -- methylene chloride
CPT/MIP -- Cone penetrometer/membrane interface probe



Legend

- Shallow Groundwater Monitoring Well
- Intermediate Groundwater Monitoring Well
- Deep Groundwater Monitoring Well
- Proposed CPT/MIP Locations
- Preliminary Contingent CPT/MIP Locations
- Proposed Soil Gas Survey Location
- Proposed Tracer Test Response Well (Preliminary)
- Cross Section
- Groundwater Flow Direction
- Site
- Former Building and Concrete Slab
- Roads
- TNT Cooling Water Drain Line (North)
- TNT Cooling Water Drain Line (South)
- TNT Wastewater Line

Notes:
1. All concentrations are reported in micrograms per liter (µg/L).
2. Results listed in this order;
   Methylene Chloride
   1,2-Dichloroethane
   Trichloroethene
3. ND - non detect.
4. MCL - maximum contaminant level.
5. CPT/MIP - Cone penetration technology/membrane interface probe.

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Figure 3-2
Proposed Soil Gas Survey, CPT/MIP, and Monitoring Well Locations
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

February 2014

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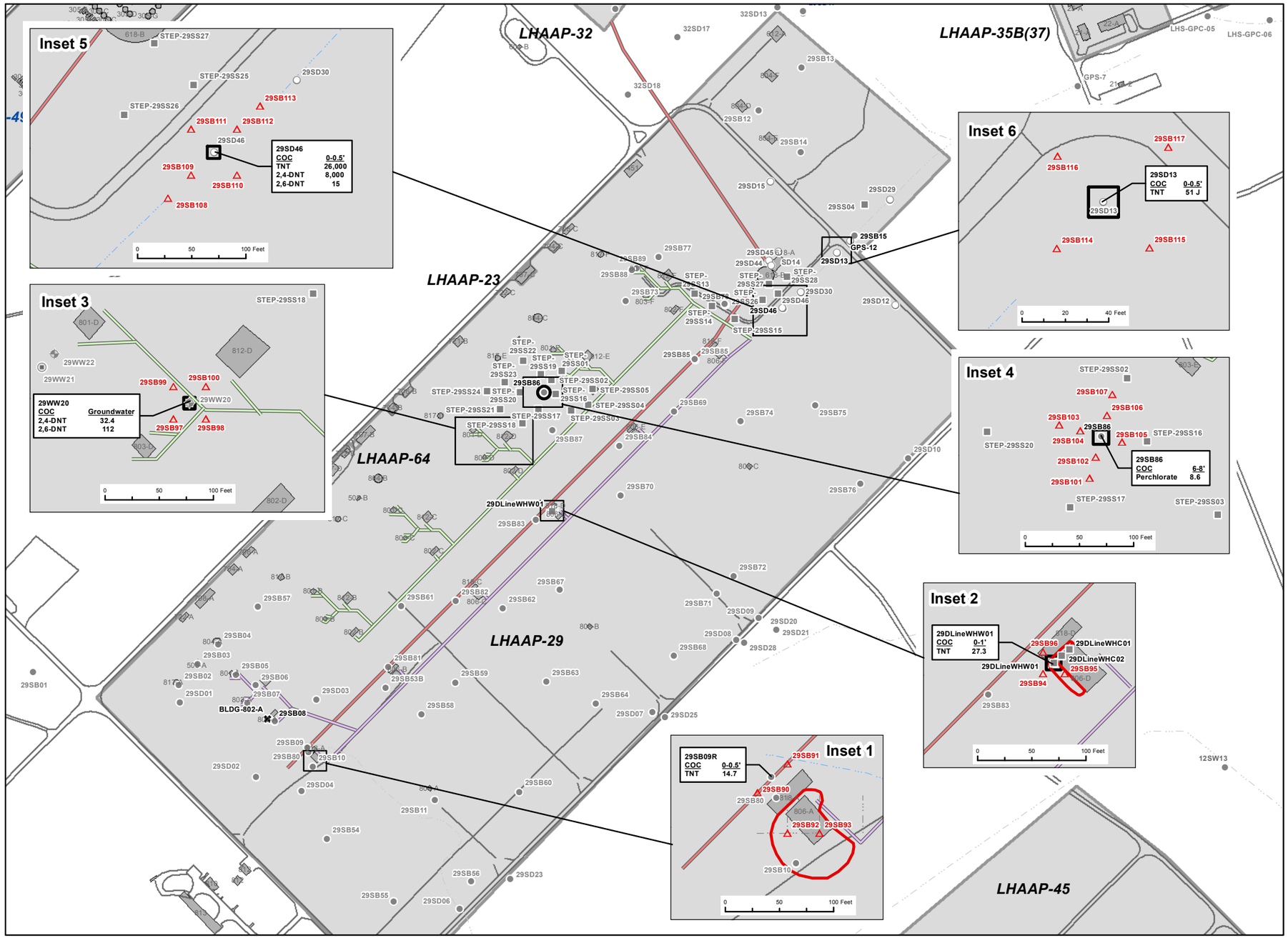


Legend

- Proposed Soil Sample Locations
- Former Building Locations
- Existing Surface Soil Sample Location
- Existing Soil Boring Location
- Existing Sediment Sample Location
- Shallow Groundwater Monitoring Well
- Intermediate Groundwater Monitoring Well
- Existing Sample Location with COC Concentrations Exceeding GWP-Ind
- Stained Soil
- Former Building or Concrete Slab
- Site
- TNT Cooling Water Drain Line (South)
- TNT Cooling Water Drain Line (North)
- TNT Wastewater Line
- Streams
- Roads

0 225 450 900 Feet

Notes:
1. Depths are reported in feet below ground surface.
2. Soil sample concentrations in milligrams per kilogram (mg/kg) and groundwater concentrations in micrograms per liter (µg/L).
3. All COC concentrations shown on this figure exceed their applicable cleanup levels.
4. TNT - Trinitrotoluene
5. DNT - Dinitrotoluene
6. COC - Contaminant of Concern
7. GWP-Ind - Soil medium specific concentration for industrial use based on groundwater protection.

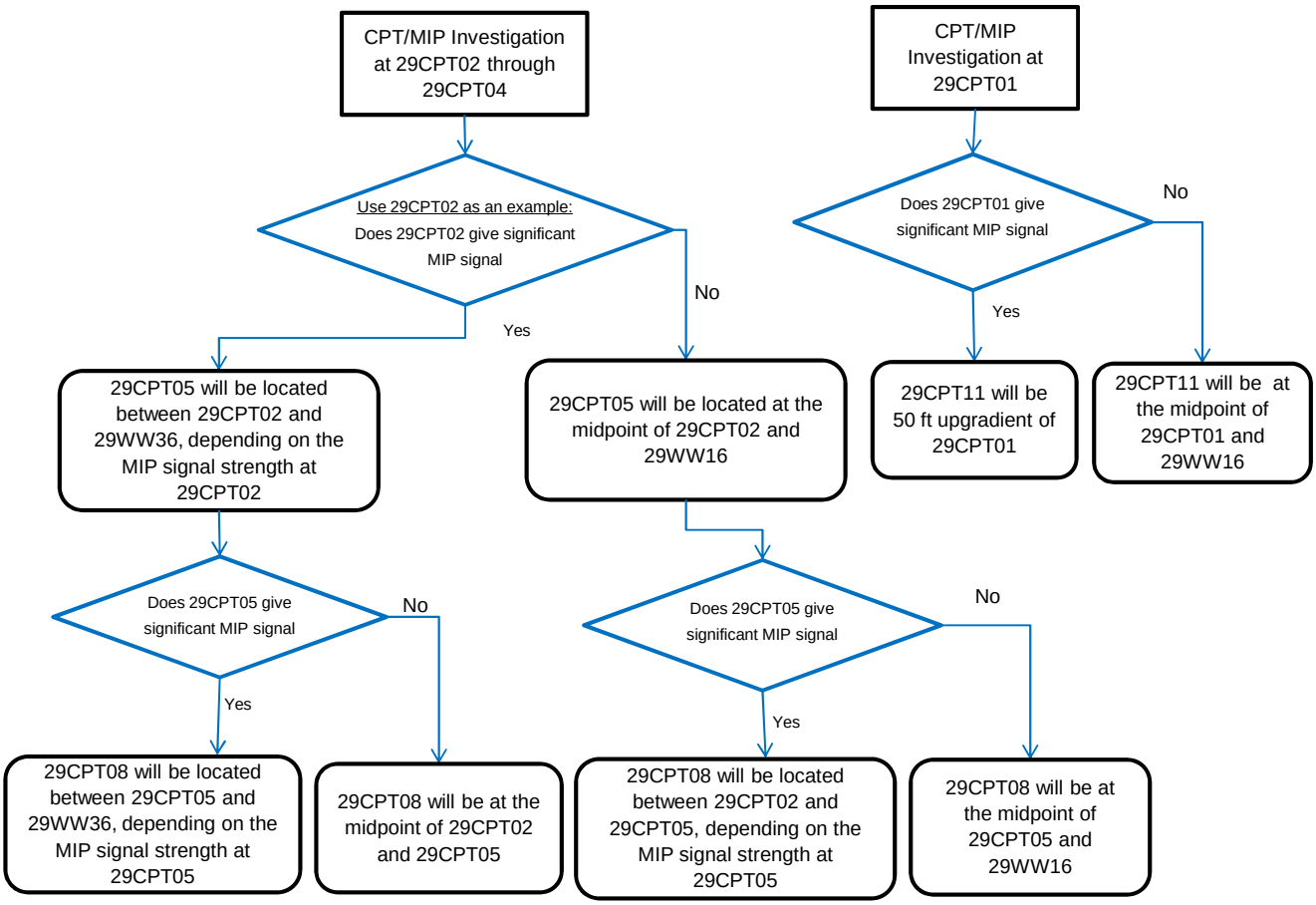
AECOM

Figure 3-3
Proposed Soil Sample Locations
LHAAP-29
Longhorn Army Ammunition Plant
Karnack, Texas

60274185 March 2014

Path: L:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-29\2014-June-19\Figure 3-3 LHAAP-29 Proposed Soil Sample Locations.mxd

Figure 3-4: Flow Chart of Decision Rules on CPT/MIP Locations



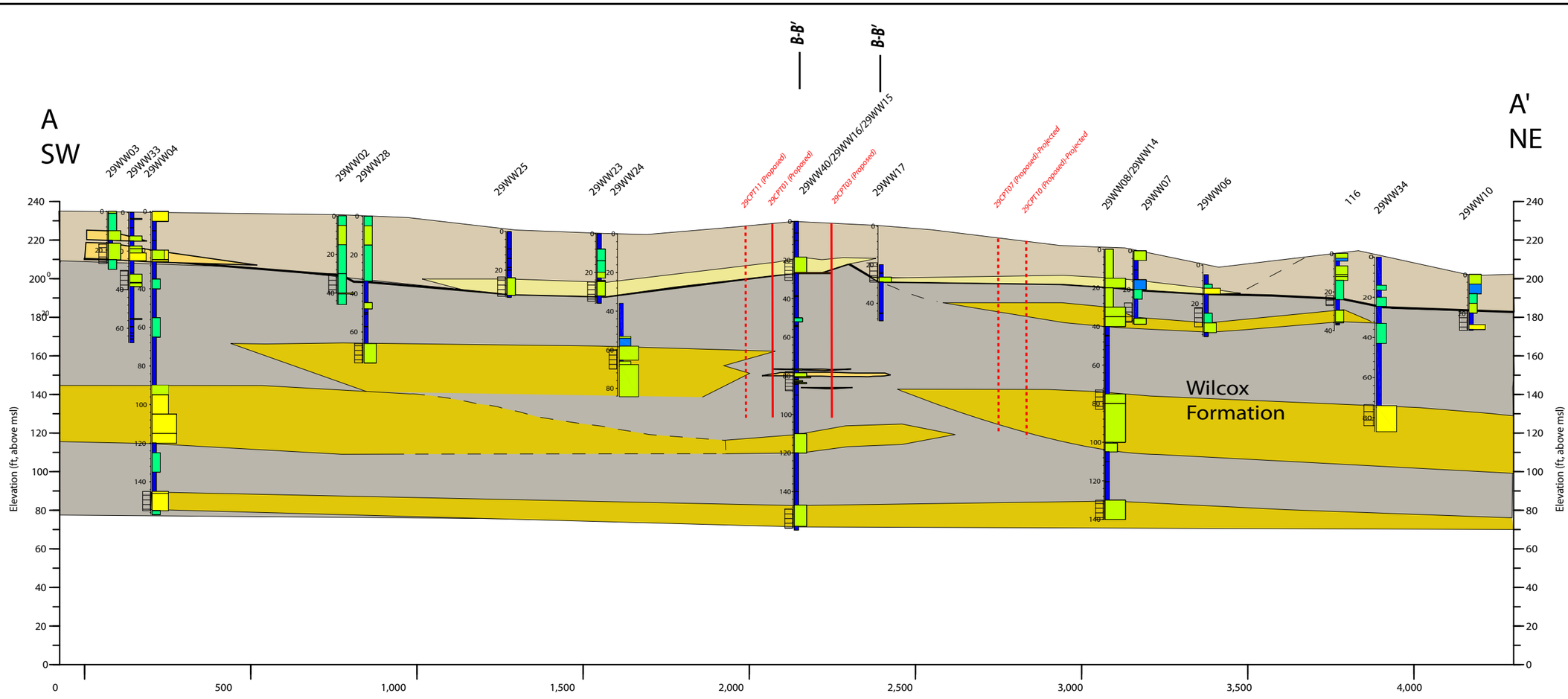
Legend:

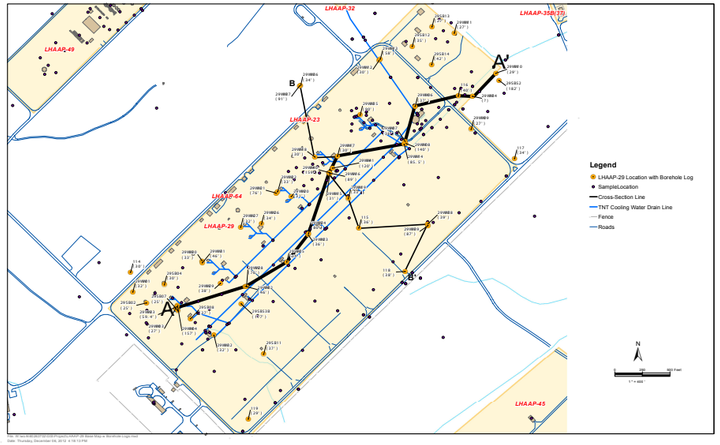
Pre-determined field process

Decision-making process

Alternate process

Notes:
CPT/MIP -- Cone penetrometer/membrane interface probe





Grain Size Log

- Clay
- Silt-Sandy Silt
- Fine Sand w/fines
- Fine Sand
- Medium Sand w/fines
- Medium Sand
- Coarse Sand w/fines
- Coarse Sand
- Gravel, Sand w/ gravel

Lithofacies

Sand Lithofacies

- Channel and point bar deposits
- Levee and splay deposits
- Wilcox Fm.marine and deltaic sands (Eocene)

Silt/Clay Lithofacies

- Fine overbank deposition (flood plain silts and clays)
- Wilcox Fm.marine and deltaic clays and silts (Eocene)

Down-hole Data Legend

Monitoring Well
Data Explanation

Monitoring Well Screen

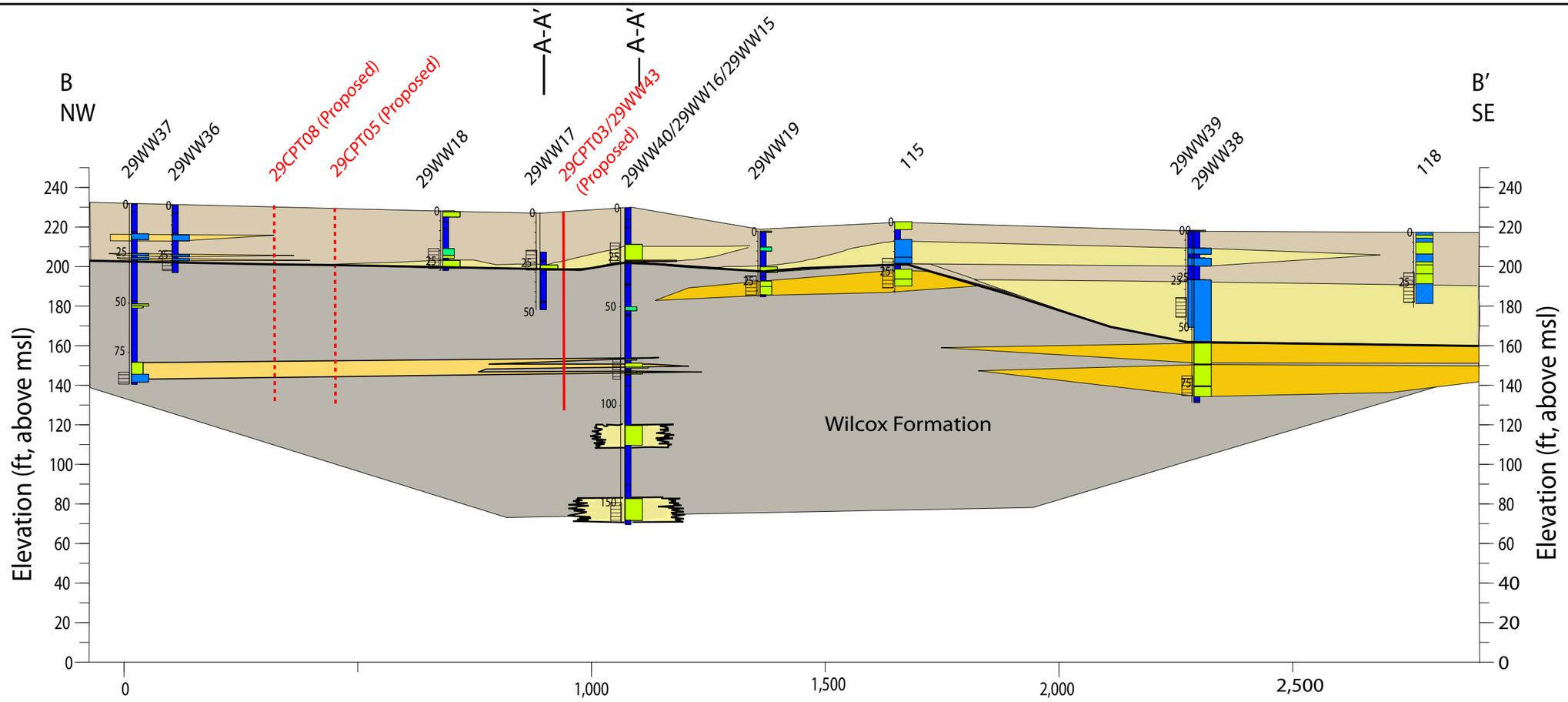
Nested wells labeled as follows: Deeper/Shallower

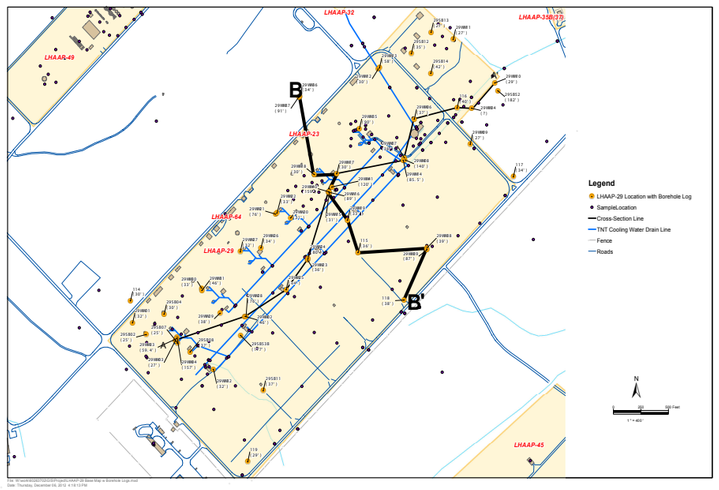
- Proposed CPT/MIP Locations
- Preliminary Contingent CPT/MIP Locations

AECOM

Figure 3-5
Cross Section A-A' with Proposed CPT/MIP Locations
LHAAP-29
Longhorn Army Ammunition Plant, Karnack, Texas

60274185 February 2014





Grain Size Log

- Clay
- Silt-Sandy Silt
- Fine Sand w/fines
- Fine Sand
- Medium Sand w/fines
- Medium Sand
- Coarse Sand w/fines
- Coarse Sand
- Gravel, Sand w/ gravel

Lithofacies

Sand Lithofacies

- Channel and point bar deposits
- Levee and splay deposits
- Wilcox Fm.marine and deltaic sands (Eocene)

Silt/Clay Lithofacies

- Fine overbank deposition (flood plain silts and clays)
- Wilcox Fm.marine and deltaic clays and silts (Eocene)

Down-hole Data Legend

Monitoring Well Data Explanation

Monitoring Well Screen

Nested wells labeled as follows: Deeper/Shallower

- Proposed CPT/MIP Locations
- Preliminary Contingent CPT/MIP Locations

AECOM

Figure 3-6
Cross Section B-B' with Proposed CPT/MIP Locations
LHAAP-29
Longhorn Army Ammunition Plant, Karnack, Texas

60274185

February 2014

Table 3-1: Summary of Proposed Soil Sample Locations, Depths, and Analysis

Existing Hot Spot	Proposed Sample Locations	Step-out Distance, feet	Proposed Sample Depth, ft bgs	Analysis	Rationale
Stained soil near building 806-A	29SB90	20	0-0.5	Explosives (Method 8095)	•Previous sample from 29SB09R exceeds GWP-Ind for explosives. •Two step out locations at 20 ft distance along the TNT wastewater line.
	29SB91	20			
	29SB92	NA	0-2, 2-4[(a)]		•No sample location with risk exceedance in this vicinity. •Collect samples from the stained area and evaluate contamination.
	29SB93	NA			
29DLineWHW01 (stained soil near building 806-D)	29SB94	20	0-1, 2-4[(a)]	Explosives (Method 8095)	•Previous sample from 29DLineWH01 poses ecological risk. •Three step-out locations at 20 ft distance. No step-out location to the northeast of 29DLineWH01 as two previous samples, 29DLineWHC01 and 29DlineWHC02, showed no unacceptable risks.
	29SB95	20			
	29SB96	20			
29WW20	29SB97	30	0-2, 2-4[(a)]	Explosives (Method 8095)	•No soil samples previously collected in this vicinity; however, groundwater from monitoring well 29WW20 showed contamination of explosives in 2005. •Soil sample locations in four directions from 29WW20 with a distance of 30 ft.
	29SB98	30			
	29SB99	30			
	29SB100	30			
29SB86	29SB101[(a)]	40	6-8, 8-10, 10-12[(a)]	Perchlorate (Method 6850) and VOCs (Method 8260)	•Previous sample from 29SB86 exceeds GWP-Ind for perchlorate. •High concentrations of methylene chloride were detected in monitoring wells (29WW15 and 29WW16) approximately 140 feet to the east of 29SB86. •Four step-out locations at 20 ft distance. •Three further step-out locations at 40 ft distance with contingent analysis[(a)]. No further step-out location to the east as it coincide with previous sample location STEP-29SS16.
	29SB102	20			
	29SB103[(a)]	40			
	29SB104	20			
	29SB105	20			
	29SB106(a)	20			
	29SB107[(a)]	40			
29SD46	29SB108[(a)]	60	0-0.5, 2-4[(a)]	Explosives (Method 8095)	•Previous sample from 29SD46 poses human health risk. •Four step-out locations at 30 ft distance. •Two further step-out locations at 60 ft distance along the direction of pipeline with contingent analysis[(a)].
	29SB109	30			
	29SB110	30			
	29SB111	30			
	29SB112	30			
	29SB113[(a)]	60			
29SD13	29SB114	30	0-0.5, 2-4[(a)]	Explosives (Method 8095)	•Previous sample from 29SD13 poses human health risk. •Use step-out distance of 30 ft. •29SB117 uses a larger step-out distance of 37 ft along the drainage ditch to the northeast.
	29SB115	30			
	29SB116	30			
	29SB117	37			

Notes:
ft - feet
bgs - below ground surface
[(a)]Contingent analysis: further step-out samples and deeper interval samples will be analyzed if the proposed inner step-out samples or shallow interval samples exceed risk thresholds.

Table 3-2: Summary of Proposed CPT/MIP Investigation, and Soil and Groundwater Sample Locations

Proposed Investigation Locations	CPT/MIP Investigation depth, feet	Rational	Soil Samples for VOCs (8260B)	Soil Samples for TOC (ASTM 2974)	Grab Groundwater Samples for VOCs (8260B)	Soil and Groundwater Samples for Resistivity Test (ASTM187-12a)	Note
Upgradient (south) of 29WW16							
29CPT01	90	•Conduct CPT/MIP investigation. •One of these two CPT/MIP locations will be sampled at different depth intervals for confirmatory soil and groundwater samples.	Up to 5	3	3	Up to 3 soil cores 1 groundwater sample	--
29CPT11	90						
Downgradient (northwest) of 29WW16, between 29WW16 and 29WW37							
29CPT02	90	•Conduct CPT/MIP investigation. •One of these two CPT/MIP locations will be sampled at different depth intervals for confirmatory soil and groundwater samples.	Up to 5	3	3	Up to 3 soil cores 1 groundwater sample	•An intermediate zone groundwater monitoring well will be installed near one of these three locations where high MIP signals are detected. •Continuous soil coring and logging will be conducted during well installation.
29CPT05	90						
29CPT08	90						
Downgradient (north) of 29WW16, between 29WW16 and 29WW35							
29CPT03	90	•Conduct CPT/MIP investigation. •One of these two CPT/MIP locations will be sampled at different depth intervals for confirmatory soil and groundwater samples.	Up to 5	3	3	Up to 3 soil cores 1 groundwater sample	•An intermediate zone groundwater monitoring well will be installed near one of these three locations where high MIP signals are detected. •Continuous soil coring and logging will be conducted during well installation.
29CPT06	90						
29CPT09	90						
Downgradient (northeast) of 29WW16, between 29WW16 and 29WW14							
29CPT04	90	•Conduct CPT/MIP investigation. •One of these two CPT/MIP locations will be sampled at different depth intervals for confirmatory soil and groundwater samples.	Up to 5	3	3	Up to 3 soil cores 1 groundwater sample	•An intermediate zone groundwater monitoring well will be installed near one of these three locations where high MIP signals are detected. •Continuous soil coring and logging will be conducted during well installation.
29CPT07	90						
29CPT10	90						
		Total	**up to 20**		**12**	**Up to 12**	--

Notes:
CPT -- cone penetrometer
MIP -- membrane interface probe
TOC -- total organic carbon
VOC -- volatile organic compound
ASTM187-12a -- Standard Test Method for Measurement of Soil Resistivity Using the Two-Electrode Soil Box Method

4 INVESTIGATION AND TESTING METHODS

4.1 Utility Clearance

AECOM will coordinate with USACE to evaluate the location of subsurface utilities based on existing utility maps. All borehole locations will be marked, Underground Service Alert (One Call) will be notified at least two working days prior to sampling, and a geophysical utility clearance will be performed by a private subcontractor.

All work will be performed in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

4.2 Direct Push Soil Gas, Soil and Groundwater Sampling

4.2.1 Direct Push Soil Gas Survey

The objective of the shallow soil gas survey us to screen the target areas for evidence of a VOC source area in soil and to avoid cross-contamination during the CPT/MIP investigation. The active soil gas survey will be performed using a Geoprobe direct push rig to evaluate soil contamination in the shallow depth (from 10 ft bgs to the shallow groundwater) at the former rocket "soak-out" location near Building 801-F, and in the vicinity of 29WW16. The procedure of active soil gas survey is based on the technical bulletin of *Direct Push Installation of Devices for Active Soil Gas Sampling & Monitoring* (Geoprobe, 2006) and is included in the IWWP. The collection of soil gas samples will be conducted using post run tubing (PRT) system through the DPT rods driven to the designed depth of 10 ft bgs. An expendable point will be advanced to depth on the leading end of the drive rods. Then a stainless steel PRT adapter attached to tubing will be lowered into the drive rod and connected to the fitting at the end of the drive rod. The rod is then retracted by approximately one foot to create a void in the soil for soil gas collection. Soil gas purging sampling is then conducted through the tubing attached to the PRT adapter. Soil gas samples will be collected in Summa Canisters. In addition, a photoionization detector (PID) will be used to screen the gas samples for VOCs in the field. The Summa Canisters will then be shipped to an off-site laboratory for VOC analysis. The PRT method uses an adapter and tubing to isolate the soil gas sample from the steel drive rods, and also eliminate possible leaks of ambient air from the rod joints into the gas collection stream.

4.2.2 Direct Push Soil and Groundwater Sampling

Soil samples will be collected using DPT at the following locations:

- Twenty-eight soil boring locations (29SB90 through 29SB117) as discussed in **Section 3.2** and shown on **Figure 3-3**. The sample core barrel will be advanced for soil sample collection at intervals indicated in **Table 3-1**. These soil samples will be submitted for explosives, VOCs and/or perchlorate as indicated in **Table 3-1**.
- Up to four CPT/MIP locations (likely 29CPT01 through 29CPT04), coinciding with selected MIP boreholes, as discussed in **Section 3.3.1**, shown in **Table 3-2** and on **Figure 3-2**. Up to five soil samples will be collected at each location and will be submitted for VOC analyses. Up to three soil cores and a groundwater sample from each location will be submitted for electric resistivity test. The depth interval for soil sample collection will

be determined based on MIP data, and the specific depth may further be adjusted based on PID screening during coring. Soil samples will be collected by pushing a Macro-core® or similar sampling device over a four-ft interval (with En Core® or equivalent soil sampler). After the core barrel is advanced, the rods are removed from the borehole and the acetate sleeve containing the soil is removed from the sample barrel. Representative cores or acetate sleeves will be retained to allow examination by the Army and regulators.

Three grab groundwater samples will be collected from the intermediate zone at each of the four locations as indicated in **Table 3-2**. Grab groundwater sampling will use a discrete groundwater sampling device (e.g., Geoprobe SP-15® or equivalent) which has a 3.5 ft screen length.

The DPT and sampling equipment will be decontaminated after each sample is collected to prevent cross-contamination.

The soil gas samples will be analyzed for VOCs (EPA method TO-15). Soil samples will be analyzed for VOCs (EPA Method 8260B), explosives (EPA Method 8095 or equivalent), perchlorate (EPA Method 6850), TOC (ASTM Method 2974), and soil resistivity (ASTM method 187-12a) (ASTM, 2012), as specified in Tables 3-1 and 3-2. All COC analysis will be performed in a DoD approved analytical laboratories as long as procedures do not conflict with Army-accepted protocols as determined by AECOM. Groundwater samples will be analyzed for VOCs (EPA Method 8260B) and TOC (SW-846 Method 9060). Sample analyses and analytical results validation will be conducted in accordance with the Installation-Wide Work Plan in place at the time the work is conducted.

4.3 CPT/MIP Evaluation

Boring locations have been selected to further characterize COC distribution and lithology within the suspected intermediate zone groundwater plume identified in **Section 2.0**. A total of 11 CPT/MIP boreholes will be advanced at the proposed locations shown on **Figure 3-2** using a MIP sensor integrated into a CPT rig. CPT consists of a steel cone that is hydraulically pushed into the subsurface at high pressure. Sensors on the tip of the cone measures tip pressure and friction, which are used to classify soil type. This continuous subsurface data provides an indicator of grain size and detailed lithology log that can be used to improve the definition of the stratigraphic framework underlying the site. It is also a good real-time tool for defining targeted saturated intervals for either depth discrete direct push groundwater samples or for determining screening intervals at well locations.

MIP technology is used to assess relative concentrations of VOCs in-situ. A heating element in the MIP tool volatilizes compounds in the surrounding soil and/or water. Vapor is transferred to the surface for analysis by three detectors: a PID with a 10.2 electron volt bulb, a flame ionization detector, and an electron capture detector. The three detectors together provide real time characterization and offer a range of sensitivities and a means of discriminating different classes of compounds, including chlorinated VOCs. The detectors measure total VOCs in the carrier gas and provide this information in real-time as an instrument response. The response level from the detector corresponds to the amount of VOCs present in the carrier gas, which is proportional to the amount of VOCs in the soil or ground water at the sampling location. The MIP response cannot generally be correlated to actual soil or groundwater concentrations but interpretations of relative response can accurately identify the relative distribution of COC concentrations for confirmation by other methods.

The collected CPT/MIP data will be presented in real-time and plotted in the field immediately upon completion of each borehole, to target where to collect soil and groundwater samples for laboratory analysis, and to install monitoring wells. If the MIP signal exceeds the upper limit of the detectors, which indicates possible presence of DNAPL, further advancing of CPT/MIP probe at the corresponding location(s) will be terminated to avoid carryover of DNAPL to deeper zones.

4.4 Monitoring Well Installation

Monitoring wells will be installed using either hollow-stem auger or sonic drilling techniques as indicated by the CPT results. Well installation and development will follow the procedures specified in the Installation-Wide Work Plan in place at the time field work is conducted.

4.5 Pumping Test

The aquifer pumping tests will be performed using existing well 29WW16 as the pumping well, and the three proposed new wells 29WW42 through 29WW44 as observation wells. During the pump test, water levels will also be measured in existing shallow monitoring well 29WW15 to determine the influence of pumping from the intermediate zone on the shallow zone. Aquifer testing will consist of a step-drawdown test followed by a 72-hour constant-rate pumping test and recovery test in 29WW16. Water levels will be monitored at these four wells. The objectives of the step-drawdown test include determining the specific capacity and sustainable pumping rate of the extraction well. The objectives of the constant-rate and recovery tests include calculating the aquifer hydraulic properties (transmissivity, hydraulic conductivity, and storage coefficient), and determining the number and location of additional extraction wells that may be required to capture the leading edge of the COC Plume within the intermediate zone using a groundwater flow model and particle tracking analysis.

A step-drawdown test will be performed in 29WW16, and water levels will be monitored in 29WW42 through 29WW44 and 29WW15). The objectives of the step-drawdown test are to:

- Determine the specific capacity of the well at a minimum of three different pumping rates;
- Determine the sustainable pumping rate to be used for the constant-rate pumping test; and
- Provide a typical extraction flow rate to be used as a basis of design for the groundwater extraction.

The extraction flow rate during the first step will be less than the sustainable flow rate estimated based on hydraulic conductivities obtained from the previous slug tests. The following steps will be conducted at a successively higher rate for approximately two hours, or the amount of time it takes for drawdown in the extraction well to stabilize. The resultant drawdown curves will be used to estimate the specific capacity and efficiency of the extraction well and the maximum sustainable pumping rate of the well. Water levels recorded in the observation wells during the step-drawdown test will be used for a preliminary assessment of whether pumping from the extraction well is likely to induce drawdown in the observation wells.

Following completion of the step-drawdown test, a minimum 72-hour constant-rate pumping test will be performed in 29WW16 followed by recovery monitoring in 29WW16, and 29WW42 through 29WW44 and, if applicable, shallow well 29WW15. The objective of the constant-rate

pumping test is to determine aquifer hydraulic properties including transmissivity, hydraulic conductivity, and storage coefficient as well as the influence of extended pumping from the intermediate zone on the shallow zone.

4.6 In-situ Microcosm Test

The in-situ microcosm study will be conducted to evaluate the effectiveness of natural attenuation and the potential for EISB, using Bio-Traps with SIP. SIP is an innovative method to track the environmental fate of a "labeled" COC to unambiguously determine whether biodegradation is occurring and to evaluate MNA. With the SIP method, a Bio-Trap sampler is amended with a specially synthesized form of the contaminant containing heavy carbon (^{13}C) as the "label". Since ^{13}C is rare, carbon originating from labeled contaminant can be readily distinguished from carbon (predominantly ^{12}C) from other sources. In the field, the Bio-Trap is suspended in an existing monitoring well within impacted zone for a designated period of time (30-90 days). During in well deployment, the ^{13}C labeled contaminant (e.g.,^{13}C-MC) on the Bio-Trap is subject to the same physical, chemical, and microbiological processes as the unlabeled contaminant present at the site. If biodegradation is occurring, the ^{13}C label from the synthesized contaminant will be incorporated into the end products of biodegradation: microbial biomass and carbon dioxide. Following field deployment, the Bio-Trap® is recovered and two analytical methods are used to conclusively determine whether biodegradation of the contaminant occurred in-situ: quantification of ^{13}C enriched phospholipid fatty acids (PLFA) indicates incorporation into microbial biomass and quantification of ^{13}C enriched dissolved inorganic carbon (DIC) indicates contaminant mineralization.

For this study, Bio-Traps will be amended with ^{13}C-MC. Briefly, Bio-Traps contain Bio-SEP® beads, an engineered composite of Nomex and powdered activated carbon (PAC), as the sampling matrix. The beads are 2-3 millimeter in diameter, have a large surface area for microbial attachment, and due to their adsorptive capacity, can be loaded with ^{13}C labeled MC. Prior to shipping for field deployment, Bio-Traps® amended with ^{13}C-MC will be subject to a leaching study similar to an adsorption isotherm to remove the labile fraction of the adsorbed contaminant. At the conclusion of the leaching study, the concentration of the ^{13}C MC on the Bio-Sep® beads will be quantified to establish the pre-deployment concentration and the Bio-Traps will be shipped to the field for deployment.

A total of six Bio-Traps will be suspended two monitoring wells, likely 29WW16 and another monitoring well with moderate level of MC. Each of the two wells will house three Bio-Traps, one without any biodegradation stimulants, one with EVO as substrate to stimulate anaerobic biodegradation, and another one with ORC® to supplement oxygen and stimulate aerobic biodegradation. After an incubation period of 60 days, the Bio-Traps will be retrieved and shipped to off-site laboratory (Microbial Insight Inc.) for analysis including quantification of ^{13}C enriched PLFA and DIC.

4.7 Site Survey

After completion of the sampling activities, the soil sampling and new well locations will be surveyed by a licensed land surveyor. The survey activities (for location and elevation) will be performed in accordance with the Installation-Wide Work Plan in place at the time field work is

conducted. In addition, a subset of the existing wells (including 29WW16) will be surveyed for consistency.

4.8 Investigation Derived Wastes

IDW generated during the investigation will include soil cuttings, disposable sampling equipment, pumping-test water, equipment decontamination fluids, and personal protection equipment (PPE). Pumping test water will be collected in aboveground storage tanks and transported to the LHAAP-18/24 Groundwater Treatment Plant for treatment and likely used as water source for tracer solution mixing in the contingent tracer injection test. The unused portion of treated water will be disposed of properly. IDW (except PPE and disposable sampling equipment) will be containerized pending analytical results and waste profiling. The IDW management storage and disposal will be performed in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

4.9 Health and Safety Procedures

The health and safety procedures described in the LHAAP Installation-Wide Work Plan in place at the time field work is conducted will be complied with during field activities. AECOM anticipates field work will be performed in Level D modified PPE that will include a hard hat, safety glasses, steel-toed boots, and nitrile gloves. Additional PPE may include bug spray, Tyvek® suits, poison oak block, and reflective safety vests depending on the location and type of field activities.

The medical centers associated with this project include Workcare (Occupational Clinic) located at Marshall, Texas. An emergency contact list and emergency route maps are included in the Installation-Wide Work Plan.

4.10 Reporting

The results of the field activities, any deviations from this Work Plan and subsequent technology evaluations and cost estimates will be presented in the RI/FS Addendum. The RI/FS Addendum will be focused on the evaluation of ISTD and EISB technology options and will not include any revisions of previous evaluations and cost estimates for the technologies covered in the 2010 FS.

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DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
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RATCLIFF, AR 72951

July 8, 2014

DAIM-ODB-LO

Mr. Rich Mayer
US Environmental Protection Agency
Federal Facilities Section R6
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Final Baseline Ecological Risk Assessment Addendum,
Longhorn Army Ammunition Plant, Karnack, Texas, July 2014

Dear Mr. Mayer,

An electronic version and replacement pages for the above-referenced document are being transmitted to you. The Draft BERA was issued in April 2014. Only a few minor changes were made in response to comments received from the U.S. Environmental Protection Agency (the response to comments is also included). It was decided that hard copy replacement pages would be issued so that those who received Draft versions in binders could replace the pages that required edits. The electronic version contains the full Final BERA.

The document was prepared by AGEISS on behalf of the Army as part of AGEISS' A-E contract for the facility.

This deliverable is submitted in accordance with the Federal Facilities Agreement and is the final deliverable for this project. The point of contact for this action is the undersigned. I ask that Melissa Russ, AGEISS' Project Manager, be copied on any communications related to the project. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

Rose M. Zeiler

Rose M. Zeiler, Ph.D.
Longhorn AAP Site Manager

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DEPARTMENT OF THE ARMY
LONGHORN ARMY AMMUNITION PLANT
POST OFFICE BOX 220
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July 8, 2014

DAIM-ODB-LO

Ms. April Palmie
Texas Commission on Environmental Quality Superfund Section, MC-136
12100 Park 35 Circle, Bldg D
Austin, TX 78753

Re: Final Baseline Ecological Risk Assessment Addendum,
Longhorn Army Ammunition Plant, Karnack, Texas, July 2014

Dear Ms. Palmie,

An electronic version and replacement pages for the above-referenced document are being transmitted to you. The Draft BERA was issued in April 2014. Only a few minor changes were made in response to comments received from the U.S. Environmental Protection Agency (the response to comments is also included). It was decided that hard copy replacement pages would be issued so that those who received Draft versions in binders could replace the pages that required edits. The electronic version contains the full Final BERA.

The document was prepared by AGEISS on behalf of the Army as part of AGEISS' A-E contract for the facility.

This deliverable is submitted in accordance with the Federal Facilities Agreement and is the final deliverable for this project. The point of contact for this action is the undersigned. I ask that Melissa Russ, AGEISS' Project Manager, be copied on any communications related to the project. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

Rose M. Zeiler, Ph.D.
Longhorn AAP Site Manager

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FINAL

Baseline Ecological Risk Assessment Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

Contract No. W912BV-10-D-2010
Task Order 0004

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ABBREVIATION / ACRONYM LIST

AGEISS	AGEISS Inc.
BERA	Baseline Ecological Risk Assessment
CB&I	CB&I Federal Services, LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COPEC	Chemical of Potential Ecological Concern
DNT	dinitrotoluene
EE/CA	Engineering Evaluation/Cost Analysis
EPC	Exposure Point Concentration
ESV	Ecological Screening Value
FFA	Federal Facilities Agreement
HMX	octogen
HQ_{screen}	Screening-Level Hazard Quotient
ISA	Industrial Sub-Area
ITS-ENV	Intertek Testing Services Environmental Laboratories, Inc.
Jacobs	Jacobs Engineering
LANL	Los Alamos National Laboratory
LHAAP	Longhorn Army Ammunition Plant
LISA	Low Impact Sub-Area
MDC	Maximum Detected Concentration
mg/kg	milligrams per kilogram
PRG	Preliminary Remediation Goal
RDX	cyclotrimethylenetrinitramine
Shaw	Shaw Environmental & Infrastructure, Inc.
SVOC	Semivolatile Organic Compound
TCEQ	Texas Commission on Environmental Quality
TNT	2,4,6-trinitrotoluene
UCL	Upper Confidence Limit on the Mean
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
WSA	Waste Sub-Area

1.0 INTRODUCTION

This Baseline Ecological Risk Assessment (BERA) Addendum at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas, has been prepared by AGEISS Inc. (AGEISS) for the U.S. Army Corps of Engineers (USACE), Tulsa District, under Task Order 0004 of Contract Number W912BV-10-D-2010. This BERA Addendum describes the analysis and interpretation of explosives data collected from the LHAAP that address data gaps associated with a BERA previously performed at the installation (Shaw Environmental & Infrastructure, Inc. [Shaw], 2007). The U.S. Army Environmental Command provides funding for the environmental remedial activities at LHAAP. The Base Realignment and Closure Division is responsible for all aspects of LHAAP including the environmental program, operations, and land transfer.

1.1 Background

The former LHAAP is an inactive, government-owned, formerly contractor operated and maintained Department of Defense facility. The facility is located in central-east Texas in the northeastern corner of Harrison County, and occupies 8,416 acres between State Highway 43 at Karnack, Texas, and the western shore of Caddo Lake (**Figure 1**). LHAAP was established in October 1942 with the primary mission to produce 2,4,6-trinitrotoluene (TNT) flake. LHAAP was placed on the Superfund National Priorities List (NPL) on August 9, 1990. Activities to remediate contamination began in 1990. After its listing on the NPL, the U.S. Army, the U.S. Environmental Protection Agency (USEPA), and the Texas Water Commission (currently known as the Texas Commission on Environmental Quality [TCEQ]) entered into a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §120 Federal Facilities Agreement (FFA) for remedial activities at LHAAP. The FFA became effective December 30, 1991. LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army Armament, Munitions, and Chemical Command as excess property. The majority of LHAAP has been transferred by the U.S. Army to the U.S. Fish and Wildlife Service for management as the Caddo Lake National Wildlife Refuge.

An installation-wide BERA was performed at the LHAAP and finalized in November, 2007 (Shaw, 2007). The data used in the BERA included a synthesis of many environmental investigations that had previously been performed by other subcontractors at the facility in prior years. The abiotic data (biotic, or tissue, data were also used in the latter stages of the BERA), that was the foundation for most of the BERA calculations that were used to develop conclusions, consisted primarily of the following:

- ***BERA Dataset***. This was the primary dataset used to calculate potential risks to various representative ecological receptors in the BERA. These data were comprised of analytical data from soil, sediment, and surface water samples collected as part of multiple environmental investigations performed between 1993 and late 2003 or early 2004 (depending on the medium). The BERA dataset was used to develop exposure point concentrations (EPC) that were used to identify chemicals of potential ecological concern (COPEC), and were also adopted as input concentrations for food chain modeling and other analyses.

- ***Post-BERA Dataset.*** These data include additional data that became available while the BERA was in progress, primarily between late 2003 or early 2004 and 2007, when the BERA was finalized. These data were evaluated separately in the BERA (see Section 15.8.7.1 of Shaw,

2007) to ensure that information obtained during more recent sampling events did not affect the conclusions developed using the BERA dataset.

Data were organized in the BERA by terrestrial and aquatic exposure units. The three terrestrial exposure units at LHAAP are "sub-areas" that had been previously delineated based on their common historical uses and similar ecological habitat (Shaw, 2007) (**Figure 2**). These sub-areas include the Low Impact Sub-Area (LISA), the Industrial Sub-Area (ISA), and the Waste Sub-Area (WSA). The WSA was the only sub-area where explosives compounds were identified as COPEC in the BERA. The four aquatic exposure units at LHAAP are four watersheds that drain to Caddo Lake to the east, including Central Creek, Goose Prairie Creek, Harrison Bayou, and Saunders Branch. Explosives were not selected as COPECs in any of the four watersheds in the BERA.

During data review exercises performed as part of additional remedial and investigatory activities at LHAAP following the completion of the BERA, it was discovered that some faulty data were inadvertently used in the BERA. These data included data for explosives compounds collected for the LHAAP investigation in the 1993 to 1995 timeframe that were analyzed by Intertek Testing Services Environmental Laboratories, Inc. (ITS-ENV) in Richardson, Texas. Analytical results provided by the ITS-ENV laboratory in the 1993 to 1995 timeframe were considered suspect by USEPA, and disallowed for the purposes of environmental decision making (Jacobs Engineering [Jacobs], 2001).

Once it was discovered that the BERA had inadvertently used ITS-ENV data, CB&I Federal Services, LLC (CB&I) and AGEISS were tasked by the Army to perform an analysis to determine how the removal of these data affected confidence in the BERA conclusions, and to provide initial recommendations to address any data gaps created by the removal of the ITS-ENV data. The Army communicated the results of this analysis to the USEPA Region 6 and to the TCEQ and other stakeholders via two Data Gap Memorandum reports (AGEISS, 2013a,b). The determination was made that additional samples were needed in the LISA, ISA, and WSA for soil, and in Harrison Bayou for surface water and sediment to address data gaps created by the removal of the ITS-ENV data. A Work Plan (AGEISS, 2013c) was developed describing the locations, quantity, and quality of replacement samples that would address data gaps created following the rejection of the ITS-ENV data. Following approval of the Work Plan, replacement samples were collected in October 2013.

The additional data from the replacement samples, combined with all other useable data available for the various sub-areas and watersheds (with all ITS-ENV data removed), is referred to in this Addendum as the "revised dataset." This revised dataset provides a basis for determining whether the BERA conclusions are still valid or require modification after the ITS-ENV data were removed and replaced with valid data. Because the removal of the ITS-ENV samples only affected the explosives analytical data suite, only explosives data were collected in the replacement samples and analyzed in this BERA Addendum. Replacement sample data were validated according to the data validation procedures outlined in the Uniform Federal Policy for Quality Assurance Project Plan (AGEISS, 2013d), and subsequently entered into the project database. Data validation results are presented in the Data Validation Summary Report (AGEISS, 2014). All analytical data in the revised datasets (including the valid historical data and the current replacement samples data) are provided in **Appendices A**, **B**, and **C** for the soil, sediment, and surface water, respectively. A list of field variances that occurred during sampling activities is provided in **Appendix D**. The variances are considered relatively minor, and are not expected to affect the conclusions of this Addendum report. The recent (2013) and historical sampling locations are presented in **Figures 3** through **6** for the three sub-areas and the watershed under investigation. Large-scale maps

showing all explosives sample locations (including historical and recently collected samples to address data gaps) for the three sub-areas are presented in **Appendices E, F,** and **G** for the Low Impact Sub-Area, Industrial Sub-Area, and Waste Sub-Area, respectively. **Appendix I** presents the Response to Comments received on the Draft version of this report.

1.2 BERA Addendum Organization

This BERA Addendum is organized as follows:

- ***Section 2.0, Evaluation of Explosives in Soil.*** Summarizes the explosives constituents present in the revised soil dataset, and provides a recommendation for soil in the three sub-areas regarding the validity or possible revision of conclusions presented in the BERA (Shaw, 2007).
- ***Section 3.0, Data Gaps in Sediment and Surface Water.*** Summarizes the explosives constituents present in the revised sediment and surface water datasets, and provides a recommendation for these media in Harrison Bayou regarding the validity or possible revision of conclusions presented in the BERA (Shaw, 2007).
- ***Section 4.0, Uncertainty Analysis.*** Discusses the uncertainties associated with the data collection, statistical calculations, and analysis presented in this BERA Addendum.
- ***Section 5.0, Summary and Conclusions.*** Presents a summary of the findings of the BERA Addendum and provides recommendations regarding accepting or modifying the BERA conclusions.
- ***Section 6.0, References.*** Provides the references for this BERA Addendum.

Additional information pertaining to this BERA Addendum is presented in the following appendices:

- ***Appendix A.*** Analytical Data in the Revised Datasets for Soil (LISA, ISA, and WSA).
- ***Appendix B.*** Analytical Data in the Revised Dataset for Sediment (Harrison Bayou).
- ***Appendix C.*** Analytical Data in the Revised Dataset for Surface Water (Harrison Bayou).
- ***Appendix D.*** Field Variances that Occurred During Replacement Sample Collection.
- ***Appendix E.*** Large Scale Maps of Low Impact Sub-Area Locations.
- ***Appendix F.*** Large Scale Maps of Industrial Sub-Area Locations.
- ***Appendix G.*** Large Scale Maps of Waste Sub-Area Locations.
- ***Appendix H.*** ProUCL Output for the ISA and WSA Revised Soil Datasets.
- ***Appendix I.*** Response to Comments on Draft Baseline Ecological Risk Assessment Addendum.

2.0 EVALUATION OF EXPLOSIVES IN SOIL

This section presents an evaluation of the LHAAP revised soil dataset that includes both the valid historical data (with all ITS-ENV data removed) and data from the replacement recently collected to address data gaps created by the removal of the ITS-ENV data. As described previously, the soil exposure units, as evaluated in the BERA (Shaw, 2007), consist of three large sub-areas, the LISA, ISA, and WSA. These sub-areas are discussed separately. For each sub-area, all available data for explosives compounds in total soil (defined as 0 to 3 feet; some historical samples were also included in this dataset if at least 50 percent of their sampling interval occurred at a depth of 3 feet or less) were combined. The revised LISA, ISA, and WSA soil data are presented in **Appendix A**. Sample locations are presented in **Figures 3, 4,** and **5**, for the LISA, ISA, and WSA, respectively, with large-scale maps provided in **Appendices E, F,** and **G**.

Soil samples were collected from the three terrestrial sub-areas to address data gaps at the Longhorn facility at the locations described in the *Baseline Ecological Risk Assessment Addendum Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas* (the Work Plan) (AGEISS, 2013c). Sample collection methodology followed the approach detailed in the Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP) presented in Appendix G of the Work Plan. Surface soil samples were collected with a clean stainless steel spoon or trowel, and subsurface soil samples were collected using a clean hand auger and clean stainless steel spoon or trowel. Samples were processed, placed into sample containers, properly labeled, and shipped to the receiving laboratory for analysis. Samples were analyzed using Method SW-846 8330a for explosives. Any variances to the sampling or analytical procedures are described in **Appendix D**.

The soil data were prepared for statistical summarization as described in Section 6.1.3.3 of the BERA (Shaw, 2007). One change from the BERA approach that was made in this BERA Addendum was that the EPA software ProUCL Version 5.0.00 (EPA, 2013a) was used as the primary method of computing the 95 percent upper confidence limit on the mean (UCL) for most chemicals, rather than the bootstrapping program described in the BERA. The ProUCL software was not available at the time the BERA was performed, and is now a standard and widely accepted method for calculating UCLs for environmental investigations. ProUCL Version 5.0.00 is capable of computing population parameters and statistics which support remedial decisions for many types of datasets, including those with nondetects. Occasionally, ProUCL will recommend the 97.5 or 99 percent UCL on the arithmetic mean estimated by the Chebyshev method. In these cases, the 95 percent UCL estimated by the Chebyshev method was selected as the EPC, because this is more consistent with the intent of the reasonable maximum exposure paradigm, as defined by EPA (1989, 2002). If two 95 percent UCLs were recommended by ProUCL, the higher of the two values was selected. One drawback of ProUCL is that the software will not calculate 95 percent UCLs for datasets with very few detections, such as datasets with a single detection. Therefore, for datasets with minimal detections, the bootstrapping procedure described in the BERA was used to generate UCLs. The ProUCL output for all chemicals, where it was used to calculate a UCL, is provided in **Appendix H**.

Data summary tables were created for each sub-area that show the range of detected concentrations in soil (including minimum, maximum, and mean) and the EPC (referred to as the "Screening Concentration" in the BERA) for both the revised dataset and the value previously reported in the BERA (Shaw, 2007). A COPEC screening step using the same criteria, as presented in the BERA (see Section 6.2 in Shaw, 2007), was performed for the revised dataset. Because none of the explosives compounds are considered

bioaccumulative chemicals of concern (TCEQ, 2014), a separate evaluation protective of food chain effects (e.g., food chain modeling) was not necessary to complement the COPEC screen. HQ_{screen} values for the revised dataset (calculated by dividing the EPC for the revised dataset by the ecological screening value [ESV]) are presented in the summary tables. Chemicals with HQ_{screen} values less than 1 have very low potential to result in adverse effects, and are not considered COPECs. The ESVs that were used in the BERA (Shaw, 2007) were reviewed, and no significant updates to the ESV source documents were noted. However, no ESVs were available for 4-nitrotoluene and HMX at the time the BERA was performed, but soil screening values for both chemicals are now available in the Los Alamos National Laboratory (LANL) Eco Risk Database (LANL, 2012), and were used in this BERA Addendum. Thus, with the exception of these updated ESVs for 4-nitrotoluene and HMX, the ESVs used in the calculation of the HQ_{screen} are the same as those used for the BERA. The soil ESVs used for this BERA Addendum are presented in **Table 1**.

2.1 Low Impact Sub-Area

The LISA is an approximately 3,000+ acre sub-area that includes the following sites:

- LHAAP-11 – Suspected TNT Burial Site
- LHAAP-13 – TNT Burial Site/Acid Dump
- LHAAP-14 – Area 54 Burial Ground
- LHAAP-27 – South Test Area
- LHAAP-45 – Container Storage Area
- LHAAP-52 – Magazine Washout Area
- LHAAP-63 – Former Burial Pits
- LHAAP-XX (also known as LHAAP-54) – Ground Signal Test Area

The LISA sites had been targeted in investigations prior to the initiation of the BERA, and these investigations determined that the sites had been minimally impacted by historic activities at LHAAP. This conclusion was supported by the findings of the BERA, as no final COPECs were identified in the LISA (Shaw, 2007).

Following the removal of the ITS-ENV explosives data, and after all available explosives data in soil for the LISA were combined, the revised explosives dataset consisted of data from the following sources:

- 145 samples from the original BERA dataset
- 2 post-BERA samples
- 4 samples from a CAPE Engineering Evaluation/Cost Analysis (EE/CA) investigation (CAPE, 2007) that was performed at two LISA sites (LHAAP-27 and LHAAP-54) after the BERA was completed, and
- 16 2013 replacement samples (**Table 2**).

Explosives sample locations for the LISA are presented in **Figure 3** and in **Appendix E**. All 2013 replacement samples were collected as described in the Work Plan (AGEISS, 2013c). Also, it should be noted that the BERA dataset presented in **Table 2** includes a number of additional samples that were identified during the preparation of this BERA Addendum that were either reported as not having any useable data or not previously identified in the Draft Final Data Gaps Memorandum report (AGEISS, 2013b), which presented a basis for determining the strategy for addressing data gaps for explosives compounds. These additional samples are indicated with a footnote in **Table 2**, and consist of

samples with limited explosives data (typically just for one compound, e.g., nitrobenzene, analyzed as part of the SVOC analysis) that were not captured during the original investigation of the impact of removing the ITS-ENV data. These data provide ancillary information on explosives in this sub-area.

No explosives compounds were detected in the revised LISA dataset. Therefore, a summary table is not provided for this sub-area. This was not unexpected, as there were no explosives compounds detected in the original BERA dataset (see Table 6-18 of Shaw, 2007) or the post-BERA dataset (see Table 15-15 of Shaw, 2007), and there are no known source areas present in this sub-area. Therefore, the replacement data collected during the data gaps investigation confirm the conclusions of the BERA that no explosives compounds should be identified as COPECs in the LISA.

2.2 Industrial Sub-Area

The ISA is an approximately 2,330-acre sub-area that includes the following sites:

- LHAAP-01 – Inert Burning Grounds – 1.5 acres
- LHAAP-04 – Pilot Wastewater Treatment Plant – 1.4 acres
- LHAAP-08 – Sewage Treatment Plant – 2 acres
- LHAAP-29 – Former TNT Production Area – 85 acres
- LHAAP-32 – Former TNT Waste Disposal Plant – 9 acres
- LHAAP-35A (58) – Shop Area – 15 acres
- LHAAP-35B (37) – Chemical Laboratory – 8 acres
- LHAAP-35C (53) – Static Test Area – 26 acres
- LHAAP-46 – Plant 2 Area – 190 acres
- LHAAP-47 – Plant 3 Area – 275 acres
- LHAAP-48 – Y Area – 16 acres
- LHAAP-49 – Acid Storage Area – 19.5 acres
- LHAAP-50 – Former Sump Water Tank – 1 acre
- LHAAP-60 – Pesticide Storage Buildings – less than 1 acre
- LHAAP-67 – Above-Ground Storage Tank Farm – 12 acres

Historical activities in the ISA include TNT production, wastewater and sewage treatment, chemical laboratory, shop, test areas, pyrotechnic/rocket motor production, and pesticide storage. Although explosives compounds were detected in soil samples in the BERA dataset, no COPECs were identified in this sub-area (Shaw, 2007). However, the BERA identified one possible hot spot of nitrotoluenes at sample location 29SD46. This sample location was a part of the post-BERA dataset for Central Creek, one of the four watersheds investigated at LHAAP. TNT and 2,4-dinitrotoluene (DNT) were detected at concentrations of 26,000 milligrams per kilogram (mg/kg) and 8,000 mg/kg, respectively, in a sample collected from this location in 2004. The ditch where this sample was collected is in LHAAP-29, just south and east of 16th Street. Because LHAAP-29 is in the ISA, the BERA recommended that ecological clean-up options developed for nitrotoluenes in WSA soil (where 2,4-DNT, 2,6-DNT, and TNT were identified as COPECs) also be applied to soil and sediment in the vicinity of 29SD46 (Shaw, 2007). The Army is currently developing a work plan to define the extent of the contamination in the area of 29SD46 to determine the level of remediation that will be required for that area.

Following the removal of the ITS-ENV explosives data, and after all available explosives data in soil for the ISA were combined, the revised explosives dataset consisted of data from the following sources:

- 556 samples from the original BERA dataset
- 87 post-BERA samples
- 2 samples from a CAPE EE/CA investigation (CAPE, 2007) that was performed at one ISA site (the Static Test Area, LHAAP-53) after the BERA was completed, and
- 170 2013 replacement samples (**Table 3**).

Explosives sample locations for the ISA are presented in **Figure 4** and in **Appendix F**. With minor variances (see **Appendix D**), all 2013 replacement samples were collected as described in the Work Plan (AGEISS, 2013c). Also, it should be noted that the BERA dataset presented in **Table 3** includes a number of additional samples that were identified during the preparation of this BERA Addendum that were either reported as not having any useable data, or not previously identified in the Draft Final Data Gaps Memorandum report (AGEISS, 2013b), which presented a basis for determining the strategy for addressing data gaps for explosives compounds. These additional samples are indicated with a footnote in **Table 3**, and consist of samples with limited explosives data (often times just for one compound, e.g., nitrobenzene, analyzed as part of the SVOC analysis) that were not captured during the original investigation of the impact of removing the ITS-ENV data. These data provide ancillary information on explosives in this sub-area.

A summary table of the results of explosives compounds in the revised ISA soil dataset is presented in **Table 4**. A summary of only the results from the replacement samples collected in 2013 is presented in **Table 5**. Ten explosives compounds were detected in the revised dataset (**Table 4**). All were detected in fewer than 2 percent of available samples. For seven detected chemicals in the revised dataset, the EPCs were lower than their respective ESVs. Three explosives compounds (1,3,5-trinitrobenzene, TNT, and 2,6-DNT) had EPCs that exceeded their ESVs, but were not identified as COPECs because of their low frequency of detection. As described in Section 6.2 of the BERA (Shaw, 2007), a constituent was excluded as a COPEC for a medium if it was detected in less than 3 percent of all samples analyzed in that medium for that constituent (if a chemical was detected at a detection frequency between 3 and 5 percent, a spatial analysis was required to determine if there was a potential hot spot). Thus, according to the procedures used in the BERA, all three chemicals whose EPCs exceeded their ESVs may be removed from further consideration without additional scrutiny due to their very low frequency of detection. Two of these three chemicals with EPCs greater than their ESVs (1,3,5-trinitrobenzene and 2,6-DNT) only marginally exceeded their respective ESVs, resulting in HQ_{screen} values that did not exceed 1 when rounded to one significant figure (**Table 4**). However, the HQ_{screen} value for TNT exceeded 30, and the maximum detected concentration (MDC) of 57,000 mg/kg was highly elevated. Although additional evaluation is not required by the guidelines of the BERA evaluation, TNT is discussed in greater detail in the following paragraphs.

TNT was detected in 6 out of 321 soil samples at concentrations ranging from 3.9 mg/kg to 57,000 mg/kg (**Table 4**). Nearly all of the detections of TNT were in the historical BERA samples, either as part of the BERA or post-BERA datasets; as shown in **Table 5**, TNT was only detected in 1 out of the 170 ISA data gap replacement samples at a concentration of 14.7 mg/kg, which is below the ESV of 30 mg/kg. The elevated EPC of 1,025 mg/kg is primarily associated with the highly elevated MDC of 57,000 mg/kg, which was more than two orders of magnitude greater than the next highest detection. The MDC was detected in a shallow (0 to 0.5 feet) soil sample collected in July, 1998, at sample location 32SS03 in

LHAAP-32, which was a former TNT Waste Disposal Plant. Two other soil samples in the immediate vicinity of 32SS03 also had concentrations of TNT that exceeded its ESV: one was from location 32SB22 (46 mg/kg) and the other was the deeper (1 to 3 feet) soil sample at the same location where the MDC was collected (32SS03; 45 mg/kg). One other nearby sample (location 32SS04) also had detectable levels of TNT. Thus, three of the six samples in the ISA with detectable concentrations of TNT, including the MDC of 57,000 mg/kg, were located in a relatively small area of LHAAP-32. A high density of soil samples was collected from this portion of the ISA (**Figure 7**) because of the elevated nitrotoluenes in this particular area. In total, 23 soil samples (including 13 historical samples and 10 replacement samples) from 14 locations within 150 feet of 32SS03 were collected. However, TNT was only detected in the four historical samples described previously. Importantly, surface (0 to 0.5 feet) and subsurface (0.5 to 3 feet) soil samples were collected from sample locations 32SS03 and 32SS04 during the 2013 data gaps investigation, and the elevated results previously reported at this location could not be replicated; all results were non-detect for TNT. A 2004 sample collected from the 0 to 1 foot interval at location 32SB23, which is co-located with 32SS03, was also non-detect for TNT. Therefore, the highly-elevated concentration of 57,000 mg/kg detected in a 1998 soil sample is considered to be either a units error or anomalous, and a hot spot for TNT is not present at sample location 32SS03. A list of the results from all available data from samples in the vicinity of 32SS03 is presented in the following table.

Sample Location	Sample No.	Sample Date	Detected TNT Concentration (mg/kg)
29SD26	29SD26	7-Oct-98	ND
32SB14	L0001-32SB14	16-Aug-04	ND
32SB14R	32SB14R-SB(.5-3)	23-Oct-13	ND
32SB14R	32SB14R-SS(0-.5)	23-Oct-13	ND
32SB15	L0001-32SB15	16-Aug-04	ND
32SB16	L0001-32SB16	16-Aug-04	ND
32SB17	L0001-32SB17	17-Aug-04	ND
32SB18	L0001-32SB18	17-Aug-04	ND
32SB19	L0001-32SB19	17-Aug-04	ND
32SB22	L0001-32SB22	8-Sep-04	46
32SB23	L0001-32SB23	8-Sep-04	ND
32SD06R	32SD06R-SB(.5-3)	25-Oct-13	ND
32SD06R	32SD06R-SS(0-.5)	25-Oct-13	ND
32SS03	32SS03(0-0.5)	26-Jul-98	57,000
32SS03	32SS03(1-3)	26-Jul-98	45
32SS03R	32SS03R-SB(.5-3)	23-Oct-13	ND
32SS03R	32SS03R-SS(0-.5)	23-Oct-13	ND
32SS04	32SS04(0-0.5)	26-Jul-98	3.9
32SS04	AVG-32SS04(1-3)	26-Jul-98	ND
32SS04R	32SS04R-SB(.5-3)	25-Oct-13	ND
32SS04R	32SS04R-SS(0-.5)	25-Oct-13	ND
32WL01R	32WL01R-SB(.5-3)	25-Oct-13	ND
32WL01R	32WL01R-SS(0-.5)	25-Oct-13	ND

ND = not detected; mg/kg = milligrams per kilogram

In addition to the COPEC screen performed using the revised dataset, the EPCs, calculated using the revised dataset and the original BERA dataset, were also compared. If any chemical selected as a COPEC had a higher EPC in the revised dataset than was used in the BERA, then there is a legitimate concern that calculated risks may have been underestimated in the BERA. Although the EPCs in the revised dataset for

seven of the ten explosives compounds are higher than the EPCs used in the BERA (**Table 4**), with the exception of TNT (which is discussed previously), the difference in EPCs was relatively minor for most chemicals (less than a factor of approximately 2), did not result in HQ_{screen} values greater than 1 when rounded to one significant figure, and were not identified as COPECs. Although there are a number of possible reasons the EPCs from the current dataset were higher for some chemicals, the differences in EPCs were not significant enough to warrant concern, particularly when the very low detection frequencies and concentrations in the recently collected data gaps samples are taken into account (**Table 5**).

Based upon the information in the previous paragraphs, no explosives compounds were selected as COPECs in the ISA soil, and evaluation of the revised dataset indicates that no chemicals require further investigation. Therefore, it is determined that the replacement data collected during the data gaps investigation confirm the conclusions of the BERA that no explosives compounds in soil should be identified as COPECs in the ISA.

2.3 Waste Sub-Area

The WSA is approximately 486 acres in size and is defined by the areas where waste disposal activities occurred at LHAAP. The WSA consists of the following sites:

- LHAAP-12 – Landfill – 7 acres
- LHAAP-16 – Old Landfill – 20 acres
- LHAAP-17 – Burning Ground No. 2 (Flashing Area) – 2.6 acres
- LHAAP-18/24 – Burning Ground No. 3/Unlined Evaporation Pond – 34.5 acres

This sub-area was the only area in which COPECs were identified in the BERA. Three nitrotoluene compounds (2,4-DNT, 2,6-DNT, and TNT) were selected as final COPECs in the WSA (Shaw, 2007).

Following the removal of the ITS-ENV explosives data and after all available explosives data in soil for the WSA were combined, the revised explosives dataset consisted of data from the following sources:

- 82 samples from the original BERA dataset
- 44 post-BERA samples (including 5 samples evaluated as "post-BERA" samples in the BERA, and 39 additional samples collected in 2010 from LHAAP-17)
- 12 2013 replacement samples (**Table 6**).

Explosives sample locations for the WSA are presented in **Figure 5** and in **Appendix G**. All 2013 replacement samples were collected as described in the Work Plan (AGEISS, 2013c). Also, it should be noted that the post-BERA dataset presented in **Table 6** includes two additional samples identified during the preparation of this BERA Addendum that were either reported as not having any useable data or not previously identified in the Draft Final Data Gaps Memorandum report (AGEISS, 2013b), which presented a basis for determining the strategy for addressing data gaps for explosives compounds. These additional samples are indicated with a footnote in **Table 6**, and consist of samples with limited explosives data (typically just for one compound, e.g., nitrobenzene, analyzed as part of the SVOC analysis) that were not captured during the original investigation of the impact of removing the ITS-ENV data. These data provide ancillary information on explosives in this sub-area.

A summary table of the results of explosives compounds in WSA soil is presented in **Table 7**.

A summary table showing only the results of the 2013 replacement sample investigation is not provided, because all of the results were nondetect. Nine explosives compounds were detected in the revised dataset (**Table 7**). For five chemicals, the EPCs were lower than their respective ESVs, and do not require further evaluation. Four chemicals (1,3,5-trinitrobenzene, TNT, 2,4-DNT, and 2,6-DNT) had EPCs that exceeded their ESVs.

As discussed in Section 2.2, EPCs calculated for the revised dataset were compared with the EPCs used in the BERA. Four explosives compounds in WSA soil were found to have higher EPCs in the revised dataset (**Table 7**). If these higher EPCs are deemed more appropriate and applicable, this may raise concern that the BERA underestimated ecological risk for these four chemicals. However, three of the four chemicals with higher revised EPCs (TNT, 2,4-DNT, and 2,6-DNT) were previously identified as final COPECs in the BERA, and ecological preliminary remediation goals (PRG) were calculated for them in the BERA that could be used for potential remedial actions (Shaw, 2007). The PRGs for these nitrotoluene COPECs are not dependent on the EPCs used in the ecological risk calculations; thus, a change in the EPC for any of these chemicals does not alter their recommended PRG for remedial action. Therefore, because these chemicals were already identified as final COPECs, and their calculated PRGs would be the same regardless of the EPC used, no additional calculations or evaluations (e.g., direct toxicity evaluation, food chain modeling, etc.) are necessary using the revised EPCs. The fourth chemical with a revised EPC that exceeded its BERA EPC, RDX, had only a marginally higher EPC than what was calculated in the BERA (0.144 mg/kg compared with 0.133 mg/kg), and was still several orders of magnitude lower than its ESV. Thus, this chemical also would not be identified as a COPEC requiring further evaluation (**Table 7**).

Based upon the information in the previous paragraphs, it is determined that the additional data collected during the data gaps investigation confirm the conclusions of the BERA that TNT, 2,4-DNT, and 2,6-DNT should be identified as final COPECs in the WSA. No other chemicals require additional consideration or evaluation. It is also notable that no explosives compounds were detected in the most recently collected WSA data gaps samples. This suggests that any residual explosives in WSA soil have either been addressed via remedial actions taken within the sub-area, or have naturally degraded.

3.0 DATA GAPS IN SEDIMENT AND SURFACE WATER

This section presents an evaluation of the LHAAP revised sediment and surface water datasets that include both historical data (with all ITS-ENV data removed) and data from the recently collected replacement samples that were intended to address data gaps created by the removal of the ITS-ENV data from the LHAAP BERA dataset. As discussed in the Data Gaps Memorandum and the Work Plan (AGEISS, 2013b, c), Harrison Bayou is the only watershed at LHAAP that required additional evaluation of impacts to the BERA conclusions resulting from the removal of the ITS-ENV data.

Sediment and surface water samples were collected from Harrison Bayou watershed to address data gaps at the Longhorn facility at the locations described in the BERA Addendum Work Plan (AGEISS, 2013c). Sample collection methodology followed the approach detailed in the UFP-QAPP presented in Appendix G of the Work Plan. Sediment samples were collected with a clean stainless steel scoop or trowel. Surface water samples were obtained using a dipper equipped with a disposable cup. Sediment and surface water samples were placed directly into sample containers, properly labeled, and shipped to the receiving laboratory for analysis. Samples were analyzed using Method SW-846 8330a for explosives. Any variances to the sampling or analytical procedures are described in **Appendix D**.

Similar data preparation steps were performed on the sediment and surface water data as was done for soil (Chapter 2.0). All available explosives data in sediment and surface water for Harrison Bayou are listed in **Tables 8** and **9**, respectively. For sediment (**Table 8**), the revised dataset consisted of the following:

- 26 samples from the original BERA dataset
- 1 post-BERA sample, and
- 8 2013 replacement samples.

With minor variances (**Appendix D**), all data gaps sediment samples were collected as described in the Work Plan (AGEISS, 2013c). For surface water (**Table 9**), the revised dataset consisted of the following:

- 21 samples from the original BERA dataset
- 1 post-BERA sample, and
- 4 2013 replacement samples.

Explosives sample locations for Harrison Bayou are presented in **Figure 6.** With minor variances, most of the data gaps surface water samples were collected as described in the Work Plan (AGEISS, 2013c). However, one planned sample (HB-ABERA-08SW) could not be collected, due to dry conditions. Therefore, only a sediment sample (HB-ABERA-08SD) was collected at this location. The revised Harrison Bayou sediment and surface water datasets are presented in **Appendices B** and **C**.

Data summary tables were not created for sediment and surface water because there were no detections of explosives in any sample from either medium. This was not unexpected, as the BERA also did not find any explosives in Harrison Bayou media (see Tables 6-20 and 6-21 in Shaw, 2007). Therefore, it is determined that the additional data collected during the data gaps investigation confirm the conclusions of the BERA that no explosives should be identified as COPECs in Harrison Bayou sediment or surface water.

4.0 UNCERTAINTY ANALYSIS

The results of this BERA Addendum are affected by variability and uncertainty, which are discussed in this section. Because the analysis presented in this report closely follows the procedures used in the BERA (Shaw, 2007), several of the uncertainties associated with that study also apply to this Addendum. Sources of uncertainty specifically associated with this BERA Addendum are discussed in greater detail in the following sub-sections.

4.1 Replacement Samples

The replacement samples were selected as a subset of the sample locations that had ITS-ENV data that were removed following the review of the BERA data. The Army communicated an approach for establishing the replacement sample locations to the USEPA Region 6 and to the TCEQ and other stakeholders via two Data Gap Memorandum reports (AGEISS, 2013a,b). As described in these documents, replacement sample locations were biased in favor of areas that were considered to have the highest likelihood of explosives contamination, e.g., locations that contained detectable levels of explosives in the rejected data, samples near other locations with valid explosives data with detectable levels of contamination, and known source areas where a release of nitrotoluenes and other explosive compounds was most likely to have occurred.

A list of field variances incurred while collecting the replacement samples is presented in **Appendix D**. Most of these variances are very minor, and the collected data are considered to accurately represent the samples described for collection in the Work Plan (AGEISS, 2013c). With the exception of one sample, all samples were collected either at the designated location or in close proximity; for nearly all locations where a sample needed to be moved due to obstructions, auger refusal, or other reasons the distance moved was within the approximate error range of the global positioning system used to find the sample locations in the field. One surface water sample in Harrison Bayou (LHAAP-HB-ABERA-08SW) could not be sampled due to dry conditions. However, the paired sediment sample from that location (LHAAP-HB-ABERA-08SD) had no detectable levels of explosives, nor did any other surface water or sediment sample in Harrison Bayou. Therefore, the inability to collect this surface water sample represents a minor uncertainty in this BERA Addendum.

In summary, the replacement samples that were collected are considered representative of those described in the Work Plan, and provide adequate data for determining whether the BERA conclusions are valid or require adjustment. Uncertainties associated with the number of samples collected, their placement, or their analysis are considered minor and do not affect the Addendum report recommendations.

4.2 Calculation of 95 Percent UCLs

The selected EPCs for this BERA Addendum were 95 percent UCLs, as they were in the original BERA, and are assumed to represent a conservative estimate of the mean concentration that environmental receptors would be exposed to during their daily movement patterns. Although a large amount of data was available, the low detection frequency exhibited by all the explosives compounds resulted in a very low number of detections. Although the ProUCL program, which was used to calculate UCLs for most chemicals, can calculate a UCL for datasets with a large percentage of nondetected observations, the accuracy of the statistics computed using such datasets is questionable (EPA, 2013b). As discussed in Section 2.0, in some instances ProUCL recommends a 97.5 or 99 percent UCL rather than a 95 percent

UCL to account for uncertainties in the data distribution or other nuances of the data set that contribute to lower confidence in the selection of a 95 percent UCL. When this occurred, the 95 percent UCL was preferentially selected for use in this BERA Addendum rather than the more conservative UCL. The rationale for this was to retain consistency with the 95 percent UCLs calculated using the bootstrapping technique for datasets with very low frequencies of detections, and to remain consistent with the reasonable maximum exposure concept for risk assessment, which typically uses a 95 percent UCL as a representative, yet conservative, estimate for exposure. For this BERA Addendum, 95 percent UCLs were selected over the recommended 97.5 or 99 percent UCLs generated by ProUCL for TNT in the ISA soil and for TNT, 2,4-DNT, and 2,6-DNT in the WSA soil. If the UCLs recommended by ProUCL were used, the EPCs would increase by approximately 35 percent for each of these chemicals; however, the COPEC designations would not change, nor would the conclusions of the comparison evaluation between the revised dataset EPC and the BERA EPC. Therefore, the selection of the 95 percent UCL for these chemicals does not affect the BERA Addendum conclusions or recommendations.

4.3 Comparison of Detection Limits to Ecological Benchmarks

No explosives were detected in the LISA soil samples, or in Harrison Bayou surface water and sediment samples, and the ISA and WSA soil had very low detection frequencies for all explosives. The ability for the laboratory's analytical method to detect concentrations of explosives at concentrations equal to or below the ESV for the replacement samples was verified in Worksheet #15 of the Quality Assurance Action Plan (AGEISS, 2013d), and discussed in Section 8.4 of the BERA (Shaw, 2007) for the historical BERA data. The analytical methods used to analyze all the media are judged to be sufficiently sensitive to conclude that non-detect results are not of significant concern for terrestrial, aquatic, and semi-aquatic receptors.

5.0 SUMMARY AND CONCLUSIONS

The LHAAP BERA (Shaw, 2007) presented the following conclusions regarding explosives compounds for the three sub-areas and one watershed that were re-evaluated in this Addendum after data gaps for nitroaromatic compounds were addressed:

- **Low Impact Sub-Area:** No final COPECs identified, no further action required.
- **Industrial Sub-Area:** No final COPECs identified, no further action required.
- **Waste Sub-Area:** 2,4-DNT, 2,6-DNT, and TNT identified as final COPECs that may require further action to address ecological concerns.
- **Harrison Bayou:** No final COPECs identified.

Based on the evaluation of the revised BERA datasets, these conclusions regarding explosives compounds are confirmed for soil in the three terrestrial sub-areas and for sediment and surface water in Harrison Bayou. Therefore, no additional modification or qualification of the BERA is necessary, and no additional action is needed to characterize the potential for environmental impacts associated with contamination in media at LHAAP.

6.0 REFERENCES

AGEISS Inc., 2013a, *Data Gap Memorandum for Explosives in Soil at the Longhorn Army Ammunition Plant, Karnack, Texas,* Draft Final, May.

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TABLES

Table 1
Selection of Ecological Screening Values for Explosives in Soil
Longhorn Army Ammunition Plant, Karnack, Texas

	Ecological Soil Screening Levels (2005)[a]				TCEQ Benchmarks (2014)[b]		Other Benchmarks					Final Ecological Screening Value
Chemical	Plants (mg/kg)	Inverts. (mg/kg)	Birds (mg/kg)	Mammals (mg/kg)	Earthworms (mg/kg)	Plants (mg/kg)	Ecological PRGs Efroymson (1997)[c] (mg/kg)	Region 5 ESLs (2003)[d] (mg/kg)	Region 4 Screening Values (2001)[e] (mg/kg)	Talmage et al. (1999)[f] (mg/kg)	LANL ESLs (2012)[g] (mg/kg)	**Soil (mg/kg)**
1,3,5-Trinitrobenzene								**0.376**				**0.376**
1,3-Dinitrobenzene								**0.655**				**0.655**
2,4,6-Trinitrotoluene								NVA	NVA	**30**		**30**
2,4-Dinitrotoluene								**1.28**				**1.28**
2,6-Dinitrotoluene								**0.0328**				**0.0328**
2-Amino-4,6-Dinitrotoluene								NVA	NVA	**80**		**80**
4-Amino-2,6-Dinitrotoluene								NVA	NVA	**80**		**80**
Nitrobenzene					**40**	NVA		1.31				**40**
4-Nitrotoluene								NVA	NVA	NVA	**22**	**22**
HMX								NVA	NVA	NVA	**27**	**27**
RDX								NVA		**100**		**100**
Tetryl								NVA		**25**		**25**

Priority of benchmarks: 1) Eco-SSL, 2) TCEQ, 3) Lower of Efroymson, 1997 and Region 5 ESL, 4)Others (Dutch Intervention Values, Region 4, etc.)
Bold numbers indicate ecological screening values previously used in the Longhorn Baseline Ecological Risk Assessment
Outlined numbers indicate new ecological screening values not previously used in the Longhorn Baseline Ecological Risk Assessment

[a] U.S. Environmental Protection Agency (EPA), 2005, *Guidance for Developing Ecological Soil Screening Levels (Eco-SSL)*, Office of Solid Waste and Emergency Response, Website version last updated March 15, 2005: http://www.epa.gov/ecotox/ecossl.

[b] Texas Commission on Environmental Quality (TCEQ), 2014, *DRAFT: Conducting Ecological Risk Assessments at Remediation Sites in Texas*, RG-263 (Revised Draft).

[c] Efroymson, R.A., Suter II, G.W., Sample, B.E. and Jones, D.S., 1997. Preliminary Remediation Goals for Ecological Endpoints. Lockheed Martin Energy Systems, Inc. ES/ER/TM-162/R2.

[d] U.S. Environmental Protection Agency (EPA), 2003, *U.S. EPA Region 5 RCRA Ecological Screening Levels (ESL)*, Website version last updated August 22, 2003: http://www.epa.gov/reg5rcra/ca/edql.htm.

[e] U.S. Environmental Protection Agency (EPA), 2001, *Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment*. Originally published November 1995. Website version last updated November 30, 2001: http://www.epa.gov/region4/waste/ots/ecolbul.htm.

[f] Talmage, S.S., D.M. Opresko, C.J. Maxwell, C.J.E. Welsh, F.M. Cretella, P.H. Reno, and F.B. Daniel, 1999, Nitroaromatic Munition Compounds: Environmental Effects and Screening Values, Reviews in Environmental Contamination and Toxicology, 161:1-156, Springer-Verlag. Screening concentration used is the lowest of the Plant and Soil Invertebrate concentrations. Wildlife (shrew) values were not included as candidates for screening values. This is consistent with TCEQ's method of only using the Plant and Earthworm values to select their screening values.

[g] Los Alamos National Laboratory (LANL), 2012, Eco Risk Database, Release 3.1, October.

NVA = No value available

Table 2
Sample Summary for the Revised Dataset for Soil [a]
Low Impact Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 1 of 3)

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
BERA Samples					
11SB03	LH11-SB03 (0-2)		3/3/93	0 - 2	SVOC
11SB04	LH11-SB04 (0-2)		3/3/93	0 - 2	SVOC
11SB05	LH11-SB05 (0-2)		3/4/93	0 - 2	SVOC
11SB06	LH11-SB06 (0-2)		3/4/93	0 - 2	SVOC
11SD13	LH11-SD13		3/31/93	0 - 0	SVOC
11WW01	11WW01 (0-2')	c	8/22/94	0 2	SVOC
11WW02	11WW02 (0-2')	c	8/20/94	0 2	SVOC
11WW03	11WW03 (0-2')	c	8/21/94	0 2	SVOC
27SB34	LH27-SB34(0-3)		3/19/93	0 - 3	SVOC
27SB38	LH27-SB38(0-2)		3/20/93	0 - 2	SVOC
FWS-003	C-SS-003	c	8/27/02	0 - 0.5	SVOC
FWS-004	C-SS-004	c	8/27/02	0 - 0.5	SVOC
FWS-005	C-SS-005	c	8/27/02	0 - 0.5	SVOC
FWS-041	C-SS-041	c	9/25/02	0 - 0.5	SVOC
FWS-042	C-SS-042	c	9/25/02	0 - 0.5	SVOC
FWS-043	C-SS-043	c	9/25/02	0 - 0.5	SVOC
FWS-050	CLNWR050	c	9/9/03	0 - 0.5	SVOC
FWS-051	CLNWR051	c	9/9/03	0 - 0.5	SVOC
FWS-055	CLNWR055	c	9/9/03	0 - 0.5	SVOC
FWS-056	CLNWR056	c	9/9/03	0 - 0.5	SVOC
FWS-062	CLNWR062	c	9/9/03	0 - 0.5	SVOC
FWS-063	CLNWR063	c	9/9/03	0 - 0.5	SVOC
FWS-073	CLNWR073	c	9/9/03	0 - 0.5	SVOC
FWS-074	CLNWR074	c	9/9/03	0 - 0.5	SVOC
FWS-075	CLNWR075	c	9/9/03	0 - 0.5	SVOC
FWS-076	CLNWR076	c	9/9/03	0 - 0.5	SVOC
FWS-077	CLNWR077	c	9/9/03	0 - 0.5	SVOC
FWS-078	CLNWR078	c	9/9/03	0 - 0.5	SVOC
FWS-079	CLNWR079	c	9/9/03	0 - 0.5	SVOC
FWS-080	CLNWR080	c	9/9/03	0 - 0.5	SVOC
FWS-081	CLNWR081	c	9/9/03	0 - 0.5	SVOC
FWS-082	CLNWR082	c	9/9/03	0 - 0.5	SVOC
FWS-083	CLNWR083	c	9/9/03	0 - 0.5	SVOC
FWS-084	CLNWR084	c	9/9/03	0 - 0.5	SVOC
FWS-085	CLNWR085	c	9/9/03	0 - 0.5	SVOC
FWS-086	CLNWR086	c	9/9/03	0 - 0.5	SVOC
FWS-087	CLNWR087	c	9/9/03	0 - 0.5	SVOC
FWS-095	CLNWR095	c	9/9/03	0 - 0.5	SVOC
FWS-098	CLNWR098	c	9/9/03	0 - 0.5	SVOC
FWS-102	CLNWR102	c	9/9/03	0 - 0.5	SVOC
FWS-103	CLNWR103	c	9/9/03	0 - 0.5	SVOC
FWS-104	CLNWR104	c	9/9/03	0 - 0.5	SVOC
FWS-105	CLNWR105	c	9/9/03	0 - 0.5	SVOC
FWS-106	CLNWR106	c	9/9/03	0 - 0.5	SVOC
FWS-107	CLNWR107	c	9/9/03	0 - 0.5	SVOC
FWS-109	CLNWR109	c	9/9/03	0 - 0.5	SVOC
FWS-110	CLNWR110	c	9/9/03	0 - 0.5	SVOC
FWS-111	CLNWR111	c	9/9/03	0 - 0.5	SVOC
FWS-120	CLNWR120	c	9/9/03	0 - 0.5	SVOC
FWS-127	CLNWR127	c	9/9/03	0 - 0.5	SVOC
FWS-136	CLNWR136	c	9/9/03	0 - 0.5	SVOC
FWS-140	CLNWR140	c	9/9/03	0 0.5	SVOC
FWS-141	CLNWR141	c	9/9/03	0 - 0.5	SVOC
FWS-142	CLNWR142	c	9/9/03	0 - 0.5	SVOC
FWS-143	CLNWR143	c	9/9/03	0 - 0.5	SVOC
FWS-144	CLNWR144	c	9/9/03	0 - 0.5	SVOC
FWS-145	CLNWR145	c	9/9/03	0 - 0.5	SVOC
FWS-146	CLNWR146	c	9/9/03	0 - 0.5	SVOC
FWS-147	CLNWR147	c	9/9/03	0 - 0.5	SVOC
FWS-148	CLNWR148	c	9/9/03	0 - 0.5	SVOC
FWS-150	CLNWR150	c	9/9/03	0 - 0.5	SVOC

Table 2
Sample Summary for the Revised Dataset for Soil [a]
Low Impact Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 2 of 3)

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
FWS-151	CLNWR151	c	9/9/03	0 - 0.5	SVOC
FWS-152	CLNWR152	c	9/9/03	0 - 0.5	SVOC
FWS-155	CLNWR155	c	9/9/03	0 - 0.5	SVOC
FWS-156	CLNWR156	c	9/9/03	0 - 0.5	SVOC
FWS-158	CLNWR158	c	9/9/03	0 - 0.5	SVOC
FWS-159	CLNWR159	c	9/9/03	0 - 0.5	SVOC
FWS-169	CLNWR169	c	9/9/03	0 - 0.5	SVOC
FWS-172	CLNWR172	c	9/9/03	0 - 0.5	SVOC
FWS-173	CLNWR173	c	9/9/03	0 - 0.5	SVOC
FWS-174	CLNWR174	c	9/9/03	0 - 0.5	SVOC
FWS-175	CLNWR175	c	9/9/03	0 - 0.5	SVOC
FWS-179	CLNWR179	c	9/9/03	0 - 0.5	SVOC
FWS-181	CLNWR181	c	9/9/03	0 - 0.5	SVOC
FWS-183	CLNWR183	c	9/9/03	0 - 0.5	SVOC
FWS-184	CLNWR184	c	9/9/03	0 - 0.5	SVOC
FWS-185	CLNWR185	c	9/9/03	0 - 0.5	SVOC
FWS-186	CLNWR186	c	9/9/03	0 - 0.5	SVOC
FWS-187	CLNWR187	c	9/9/03	0 - 0.5	SVOC
FWS-188	CLNWR188	c	9/9/03	0 - 0.5	SVOC
FWS-197	CLNWR197	c	9/9/03	0 - 0.5	SVOC
FWS-198	CLNWR198	c	9/9/03	0 - 0.5	SVOC
FWS-199	CLNWR199	c	9/9/03	0 - 0.5	SVOC
FWS-200	CLNWR200	c	9/9/03	0 - 0.5	SVOC
FWS-201	CLNWR201	c	9/9/03	0 - 0.5	SVOC
FWS-202	CLNWR202	c	9/9/03	0 - 0.5	SVOC
FWS-203	CLNWR203	c	9/9/03	0 - 0.5	SVOC
FWS-204	CLNWR204	c	9/9/03	0 - 0.5	SVOC
FWS-205	CLNWR205	c	9/9/03	0 - 0.5	SVOC
FWS-206	CLNWR206	c	9/9/03	0 - 0.5	SVOC
FWS-207	CLNWR207	c	9/9/03	0 - 0.5	SVOC
FWS-208	CLNWR208	c	9/9/03	0 - 0.5	SVOC
FWS-209	CLNWR209	c	9/9/03	0 - 0.5	SVOC
FWS-210	CLNWR210	c	9/9/03	0 - 0.5	SVOC
FWS-211	CLNWR211	c	9/9/03	0 - 0.5	SVOC
FWS-212	CLNWR212	c	9/9/03	0 - 0.5	SVOC
FWS-213	CLNWR213	c	9/9/03	0 - 0.5	SVOC
FWS-214	CLNWR214	c	9/9/03	0 - 0.5	SVOC
FWS-216	CLNWR216	c	9/9/03	0 - 0.5	SVOC
FWS-217	CLNWR217	c	9/9/03	0 - 0.5	SVOC
FWS-218	CLNWR218	c	9/9/03	0 - 0.5	SVOC
FWS-219	CLNWR219	c	9/9/03	0 - 0.5	SVOC
FWS-223	CLNWR223	c	9/9/03	0 - 0.5	SVOC
FWS-226	CLNWR226	c	9/9/03	0 - 0.5	SVOC
FWS-228	CLNWR228	c	9/9/03	0 - 0.5	SVOC
FWS-232	CLNWR232	c	9/9/03	0 - 0.5	SVOC
FWS-235	CLNWR235	c	9/9/03	0 - 0.5	SVOC
FWS-236	CLNWR236	c	9/9/03	0 - 0.5	SVOC
FWS-237	CLNWR237	c	9/9/03	0 - 0.5	SVOC
FWS-238	CLNWR238	c	9/9/03	0 - 0.5	SVOC
FWS-239	CLNWR239	c	9/9/03	0 - 0.5	SVOC
FWS-240	CLNWR240	c	9/9/03	0 - 0.5	SVOC
FWS-241	CLNWR241	c	9/9/03	0 - 0.5	SVOC
FWS-242	CLNWR242	c	9/9/03	0 - 0.5	SVOC
FWS-243	CLNWR243	c	9/9/03	0 - 0.5	SVOC
FWS-244	CLNWR244	c	9/9/03	0 - 0.5	SVOC
FWS-245	CLNWR245	c	9/9/03	0 - 0.5	SVOC
LAP-31M1	LAP-31M1		7/12/00	0 - 0.5	Explosives, SVOC
LAP-31M2	LAP-31M2		7/12/00	0 - 0.5	Explosives, SVOC
LAP-35M2	LAP-35M2		7/12/00	0 - 0.5	Explosives, SVOC
LAP-39M1	LAP-39M1		7/12/00	0 - 0.5	Explosives, SVOC
LAP-81103	LAP-81103		7/10/00	0 - 0.5	Explosives, SVOC
LAP-81105	LAP-81105		7/10/00	0 - 0.5	Explosives, SVOC

Table 2
Sample Summary for the Revised Dataset for Soil [a]
Low Impact Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 3 of 3)

Location	Sample No	Date	Depth (ft bgs)	Analyses [b]
LAP-81109	LAP-81109	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81124	LAP-81124	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81127	LAP-81127	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81129	LAP-81129	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81130	LAP-81130	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81146	LAP-81147 c	7/10/00	0 - 0.5	SVOC
LAP-81147	LAP-81146 c	7/10/00	0 - 0.5	SVOC
LAP-81152	LAP-81152	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81155	LAP-81155	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81156	LAP-81156	7/10/00	0 - 0.5	Explosives, SVOC
LAP-81158	LAP-81158	7/12/00	0 - 0.5	Explosives, SVOC
XXSB15	LHXX-SB15(0-2)	3/9/93	0 - 2	SVOC
XXSB16	LHXX-SB16(0-3)	3/9/93	0 - 3	SVOC
XXSB17	LHXX-SB17(0-2)	3/9/93	0 - 2	SVOC
XXSB18	LHXX-SB18 (0-2)	3/10/93	0 - 2	SVOC
XXSB19	LHXX-SB19(0-2.5	3/9/93	0 - 2.5	SVOC
XXSB20	LHXX-SB20(0-2.5	3/10/93	0 - 2.5	SVOC
XXSB21	LHXX-SB21(0-2.5	3/10/93	0 - 2.5	SVOC
XXSD16	LHXX-SD16	3/31/93	0 - 0	SVOC
Post-BERA Samples				
WRSUMP13-SB01	WRSUMP13-SB01-01	11/15/06	0 - 0.5	Explosives
WRSUMP13-SB01	WRSUMP13-SB01-02	11/15/06	1 - 2	Explosives
Additional Samples ("CAPE" Samples) [d]				
BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	9/7/06	0 - 0.5	Explosives
BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	9/7/06	0 - 0.5	Explosives
BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	9/7/06	0 - 0.5	Explosives
BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	9/7/06	0 - 0.5	Explosives
Data Gaps (Replacement) Samples				
11SB03R	11SB03R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
11SB03R	11SB03R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
11SB05R	11SB05R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
11SB05R	11SB05R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
11SD13R	11SD13R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
11SD13R	11SD13R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
27SB34R	27SB34R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
27SB34R	27SB34R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
27SB38R	27SB38R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
27SB38R	27SB38R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
XXSB15R	XXSB15R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
XXSB15R	XXSB15R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
XXSB17R	XXSB17R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
XXSB17R	XXSB17R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
XXSB20R	XXSB20R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
XXSB20R	XXSB20R-SB(.5-3)	10/29/13	0.5 - 3	Explosives

[a] Total soil is defined as samples 0 to 3 feet bgs. Deeper samples were also considered surface soil if at least 50% of their sampling depth interval was less than 3 ft bgs (e.g., 2 to 4 ft bgs). Field duplicate samples are not included.

[b] Only analytical data containing explosives compounds are presented for these samples. Additional analyses may also have been performed on the sample.

[c] Additional data identified in the historical investigations that were not included in the Data Gaps Memorandum.

[d] CAPE, 2007, ***Engineering Evaluation/Cost Analysis, Longhorn Army Ammunition Plant, Karnack, Texas,*** Final, October.

SVOC = Semivolatile organic compounds that include one or more explosives compounds (e.g., 2,4- and 2,6-dinitrotoluene, nitrobenzene, etc.)

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No	Date	Depth (ft bgs)	Analyses [b]
BERA Samples				
01A-SB01	LH01A-SB01-2001	12/15/93	0 - 0	SVOC
01A-SB01	LH01A-SB01-2002	12/15/93	2.5 - 2.5	SVOC
01A-SB02	LH01A-SB02-2001	12/14/93	0 - 0	SVOC
01A-SB02	LH01A-SB02-2002	12/14/93	2.5 - 2.5	SVOC
01A-SB03	LH01A-SB03-2001	12/14/93	0 - 0	SVOC
01A-SB03	LH01A-SB03-2002	12/14/93	2.5 - 2.5	SVOC
01A-SB04	LH01A-SB04-2001	12/13/93	0 - 0	SVOC
01A-SB04	LH01A-SB04-2002	12/13/93	2.5 - 2.5	SVOC
01A-SD01	LH01A-SD01-3001	12/10/93	0 - 0	SVOC
01A-SD02	LH01A-SD02-3001	12/10/93	0 - 0	SVOC
01A-SD03	LH01A-SD03-3001	12/12/93	0 - 0	SVOC
01MW01	LH01A-MW01-2001	12/2/93	0 - 0	SVOC
01MW01	LH01A-MW01-2002	12/2/93	2.5 - 2.5	SVOC
01MW02	LH01A-MW02-2001	12/5/93	0 - 0	SVOC
01MW02	LH01A-MW02-2002	12/5/93	2.5 - 2.5	SVOC
01MW03	LH01A-MW03-2001	12/7/93	0 - 0	SVOC
01MW03	LH01A-MW03-2002	12/7/93	2.5 - 2.5	SVOC
01MW04	LH01A-MW04-2001	12/10/93	0 - 0	SVOC
01MW04	LH01A-MW04-2002	12/10/93	2.5 - 2.5	SVOC
01MW05	LH01A-MW05-2001	12/8/93	0 - 0	SVOC
01MW05	LH01A-MW05-2002	12/8/93	2.5 - 2.5	SVOC
01SB22	LH01-SB22 0-2.5	3/15/93	0 - 2.5	SVOC
01SB23	LH01-SB23 0-2.5	3/15/93	0 - 2.5	SVOC
01SB24	LH01-SB24 0-2.5	3/16/93	0 - 2.5	SVOC
01SB25	LH01-SB25 0-2.5	3/16/93	0 - 2.5	SVOC
01SB26	LH01-SB26 0-2.5	3/16/93	0 - 2.5	SVOC
01SB27	LH01-SB27 0-2.5	3/17/93	0 - 2.5	SVOC
01SB28	C930319-01SB28-N00	3/19/93	0 - 0	SVOC
01SB28	LH01-SB28 (0-2.	3/17/93	0 - 2.5	SVOC
01SB29	C930330-01SB29-N00	3/30/93	0 - 0	SVOC
01SB29	LH01-SB29 (0-2.	3/17/93	0 - 2.5	SVOC
01SD06	LH01-SD06	3/31/93	0 - 0	SVOC
01SD07	C930318-01SD07-N00	3/18/93	0 - 0	SVOC
01SD07	LH01-SD07	3/31/93	0 - 0	SVOC
01SD08	30320-01SD08-N00	3/20/93	0 - 0	SVOC
01SD08	C930320-01SD08-N00	3/20/93	0 - 0	SVOC
01SD08	LH01-SD08	3/31/93	0 - 0	SVOC
01SD09	C930318-01SD09-N00	3/18/93	0 - 0	SVOC
01SD09	LH01-SD09	3/31/93	0 - 0	SVOC
01SD10	C930330-01SD10-N00	3/30/93	0 - 0	SVOC
01SD10	LH01-SD10	3/31/93	0 - 0	SVOC
01SD11	C930330-01SD11-N00	3/30/93	0 - 0	SVOC
01SD11	LH01-SD11	3/31/93	0 - 0	SVOC
01SD12	30330-01SD12-N00	3/30/93	0 - 0	SVOC
01SD12	C930330-01SD12-N00	3/30/93	0 - 0	SVOC
01SD12	LH01-SD12	3/31/93	0 - 0	SVOC
04SB03	04SB03(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
04SB03	04SB03(1-3)	12/7/00	1 - 3	Explosives, SVOC
04SB04	04SB04(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
04SB04	04SB04(1-3)	12/6/00	1 - 3	Explosives, SVOC
04SB05	04SB05(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
04SB05	04SB05(1-3)	12/6/00	1 - 3	Explosives, SVOC
04SB06	04SB06(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
04SB06	04SB06(1-3)	12/6/00	1 - 3	Explosives, SVOC
08SB01	08SB01(1-3)	12/6/00	1 - 3	Explosives, SVOC
08SB03	08SB03(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
08SB03	08SB03(1-3)	12/6/00	1 - 3	Explosives, SVOC
08SB04	08SB04(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
08SB04	08SB04(1-3)	12/6/00	1 - 3	Explosives, SVOC
08SB05	08SB05(0-0.5)	12/7/00	0 - 0.5	Explosives, SVOC
08SB05	08SB05(1-3)	12/7/00	1 - 3	Explosives, SVOC
29SB01	29SB01(0-2)	5/18/93	0 - 2	SVOC
29SB02	29SB02(0-2)	5/26/93	0 - 2	SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No	Date	Depth (ft bgs)	Analyses [b]
29SB03	29SB03(0-2)	5/26/93	0 - 2	SVOC
29SB04	29SB04(0-2)	5/29/93	0 - 2	SVOC
29SB05	29SB05(0-2)	5/27/93	0 - 2	SVOC
29SB06	29SB06(0-2)	5/19/93	0 - 2	SVOC
29SB07	29SB07(0-2)	5/19/93	0 - 2	SVOC
29SB08	29SB08(0-2)	5/27/93	0 - 2	SVOC
29SB09	29SB09(0-2)	5/28/93	0 - 2	SVOC
29SB10	29SB10(0-2)	5/19/93	0 - 2	SVOC
29SB11	29SB11(0-2)	5/25/93	0 - 2	SVOC
29SB12	29SB12(0-2)	5/30/93	0 - 2	SVOC
29SB13	29SB13(0-2)	5/29/93	0 - 2	SVOC
29SB14	29SB14(0-2)	5/30/93	0 - 2	SVOC
29SB15	29SB15-(0-2)	6/3/93	0 - 2	SVOC
29SD01	29SD01(0.5)	4/29/93	0 - 0.5	SVOC
29SD10	29SD10(0-0.5)	4/28/93	0 - 0.5	SVOC
29SD11	29SD11(0-0.5)	4/28/93	0 - 0.5	SVOC
29SD24	C-29SD24-981008	10/8/98	0 - 0	Explosives, SVOC
29SD26	29SD26	10/7/98	0 - 0	Explosives
29SS01	29SS01(0-0.5)	7/24/98	0 - 0.5	Explosives, SVOC
29SS02	29SS02(0-0.5)	7/25/98	0 - 0.5	Explosives, SVOC
29SS03	29SS03(0-0.5)	7/25/98	0 - 0.5	Explosives, SVOC
29SS04	29SS04(0-0.5)	7/25/98	0 - 0.5	Explosives, SVOC
29SS05	29SS05(0-0.5)	7/25/98	0 - 0.5	Explosives, SVOC
29SS06	29SS06(0-0.5)	7/25/98	0 - 0.5	Explosives, SVOC
29SS06	29SS06(1-3)	7/25/98	1 - 3	Explosives, SVOC
29SS07	29SS07(0-0.5)	7/25/98	0 - 0.5	Explosives, SVOC
29SS07	29SS07(1-3)	7/25/98	1 - 3	Explosives, SVOC
29SS08	29SS08(0-0.5)	7/25/98	0 - 0.5	Explosives, SVOC
29SS08	29SS08(1-3)	7/25/98	1 - 3	Explosives, SVOC
29WL02	LH29-WL-02	5/13/93	0 - 0	SVOC
32SB01	32SB01(0-2)	6/3/93	0 - 2	SVOC
32SB02	32SB02(0-2)	5/31/93	0 - 2	SVOC
32SB03	32SB03(0-2)	5/25/93	0 - 2	SVOC
32SB04	32SB04(0-2)	6/3/93	0 - 2	SVOC
32SB05	32SB05(0-2)	5/29/93	0 - 2	SVOC
32SB06	32SB06(0-2)	6/1/93	0 - 2	SVOC
32SB07	32SB07(0-2)	5/18/93	0 - 2	SVOC
32SB08	32SB08(0-2)	5/25/93	0 - 2	SVOC
32SB09	32SB09(0-2)	6/4/93	0 - 2	SVOC
32SB10	32SB10(0-2)	6/4/93	0 - 2	SVOC
32SB11	32SB11(0-2)	5/26/93	0 - 2	SVOC
32SB12	32SB12(0-2)	5/25/93	0 - 2	SVOC
32SB13	32SB13(0-2)	6/3/93	0 - 2	SVOC
32SD05	32SD05(0.5)	4/30/93	0 - 0.5	SVOC
32SD06	32SD06(0.5)	4/30/93	0 - 0.5	SVOC
32SD07	32SD07(0.5)	4/30/93	0 - 0.5	SVOC
32SD17	32SD17-981008	10/8/98	0 - 0	Explosives, SVOC
32SD18	32SD18-981008	10/8/98	0 - 0	Explosives, SVOC
32SS01	32SS01(0-0.5)	7/26/98	0 - 0.5	Explosives, SVOC
32SS01	32SS01(1-3)	7/26/98	1 - 3	Explosives, SVOC
32SS02	32SS02(0-0.5)	7/26/98	0 - 0.5	Explosives, SVOC
32SS02	32SS02(1-3)	7/26/98	1 - 3	Explosives, SVOC
32SS03	32SS03(0-0.5)	7/26/98	0 - 0.5	Explosives, SVOC
32SS03	32SS03(1-3)	7/26/98	1 - 3	Explosives, SVOC
32SS04	32SS04(0-0.5)	7/26/98	0 - 0.5	Explosives, SVOC
32SS04	32SS04(1-3)	7/26/98	1 - 3	Explosives, SVOC
35ASB03	35ASB03(0-0.5)	7/26/98	0 - 0.5	Explosives, SVOC
35ASB03	35ASB03(1-3)	7/26/98	1 - 3	Explosives, SVOC
35ASB05	35ASB05(0-0.5)	7/26/98	0 - 0.5	Explosives, SVOC
35ASB05	35ASB05(1-3)	7/26/98	1 - 3	Explosives, SVOC
35BSB01	35BSB01(0-0.5)	7/27/98	0 - 0.5	Explosives, SVOC
35BSB01	35BSB01(1-3)	7/27/98	1 - 3	Explosives, SVOC
35CSB01	35CSB01(0-0.5)	7/27/98	0 - 0.5	Explosives, SVOC
35CSB01	35CSB01(1-3)	7/27/98	1 - 3	Explosives, SVOC
46SB01	46SB01(0-0.5)	7/27/98	0 - 0.5	Explosives, SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No	Date	Depth (ft bgs)	Analyses [b]
46SB01	46SB01(1-3)	7/27/98	1 - 3	Explosives, SVOC
46SB02	46SB02(0-0.5)	7/27/98	0 - 0.5	Explosives, SVOC
46SB02	46SB02(1-3)	7/27/98	1 - 3	Explosives, SVOC
46SB03	46SB03(0-0.5)	7/27/98	0 - 0.5	Explosives, SVOC
46SB03	46SB03(1-3)	7/27/98	1 - 3	Explosives, SVOC
46SD01	46SD01-981109	11/9/98	0 - 0	Explosives, SVOC
46SD02	46SD02-981109	11/9/98	0 - 0	Explosives, SVOC
46SD05	46SD05-981110	11/10/98	0 - 0	Explosives, SVOC
46SD06	46SD06-981110	11/10/98	0 - 0	Explosives, SVOC
47SB01	47SB01(1-3)	7/27/98	1 - 3	Explosives, SVOC
47SB01	C-47SB01(0-0.5)-9807	7/27/98	0 - 0.5	Explosives, SVOC
47SB02	47SB02(1-3)	7/27/98	1 - 3	Explosives, SVOC
47SB02	C-47SB02(0-0.5)-9807	7/27/98	0 - 0.5	Explosives, SVOC
47SB03	47SB03(1-3)	7/27/98	1 - 3	Explosives, SVOC
47SB03	C-47SB03(0-0.5)-9807	7/27/98	0 - 0.5	Explosives, SVOC
48SB01	48SB01(0-0.5)	7/28/98	0 - 0.5	Explosives, SVOC
48SB01	48SB01(1-3)	7/28/98	1 - 3	Explosives, SVOC
49SB34	49SB34(0-0.5)	12/7/00	0 - 0.5	Explosives, SVOC
49SB34	49SB34(1-3)	12/7/00	1 - 3	Explosives, SVOC
49SB35	49SB35(0-0.5)	12/7/00	0 - 0.5	Explosives, SVOC
49SB35	49SB35(1-3)	12/7/00	1 - 3	Explosives, SVOC
49SB36	49SB36(0-0.5)	12/7/00	0 - 0.5	Explosives, SVOC
49SB36	49SB36(1-3)	12/7/00	1 - 3	Explosives, SVOC
50SB06	50SB06(0-0.5)	7/28/98	0 - 0.5	Explosives, SVOC
50SB06	50SB06(1-3)	7/28/98	1 - 3	Explosives, SVOC
50SS07	50SS07(0-0.5)	7/28/98	0 - 0.5	Explosives, SVOC
60SB22	60SB22(0-0.5)	7/28/98	0 - 0.5	Explosives, SVOC
60SB22	60SB22(1-3)	7/28/98	1 - 3	Explosives, SVOC
67SB01	67SB01(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
67SB01	67SB01(1-3)	12/6/00	1 - 3	Explosives, SVOC
67SB02	67SB02(0-0.5)	12/14/00	0 - 0.5	Explosives, SVOC
67SB02	67SB02(1-2)	12/6/00	1 - 2	Explosives, SVOC
67SB03	67SB03(0-0.5)	12/7/00	0 - 0.5	Explosives, SVOC
67SB03	67SB03(1-3)	12/7/00	1 - 3	Explosives, SVOC
CCSD01	CCSD01	9/17/98	0 - 0	Explosives, SVOC
FWS-016	C-SS-016	8/27/02	0 - 0.5	SVOC
FWS-021	C-SS-021	10/2/02	0 - 0.5	SVOC
FWS-022	C-SS-022	10/2/02	0 - 0.5	SVOC
FWS-025	C-SS-025	10/2/02	0 - 0.5	SVOC
FWS-026	C-SS-026	10/2/02	0 - 0.5	SVOC
FWS-029	C-SS-029	10/2/02	0 - 0.5	SVOC
FWS-035	C-SS-035	9/25/02	0 - 0.5	SVOC
FWS-036	C-SS-036	9/25/02	0 - 0.5	SVOC
FWS-038	C-SS-038	9/25/02	0 - 0.5	SVOC
FWS-112	CLNWR112	9/9/03	0 - 0.5	SVOC
FWS-113	CLNWR113	9/9/03	0 - 0.5	SVOC
FWS-114	CLNWR114	9/9/03	0 - 0.5	SVOC
FWS-115	CLNWR115	9/9/03	0 - 0.5	SVOC
FWS-116	CLNWR116	9/9/03	0 - 0.5	SVOC
FWS-117	CLNWR117	9/9/03	0 - 0.5	SVOC
FWS-121	CLNWR121	9/9/03	0 - 0.5	SVOC
FWS-122	CLNWR122	9/9/03	0 - 0.5	SVOC
FWS-125	CLNWR125	9/9/03	0 - 0.5	SVOC
FWS-126	CLNWR126	9/9/03	0 - 0.5	SVOC
FWS-128	CLNWR128	9/9/03	0 - 0.5	SVOC
FWS-129	CLNWR129	9/9/03	0 - 0.5	SVOC
FWS-130	CLNWR130	9/9/03	0 - 0.5	SVOC
FWS-131	CLNWR131	9/9/03	0 - 0.5	SVOC
FWS-132	CLNWR132	9/9/03	0 - 0.5	SVOC
FWS-133	CLNWR133	9/9/03	0 - 0.5	SVOC
FWS-134	CLNWR134	9/9/03	0 - 0.5	SVOC
FWS-160	CLNWR160	9/9/03	0 - 0.5	SVOC
FWS-161	CLNWR161	9/9/03	0 - 0.5	SVOC
FWS-164	CLNWR164	9/9/03	0 - 0.5	SVOC
FWS-165	CLNWR165	9/9/03	0 - 0.5	SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 4 of 13)

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
FWS-166	CLNWR166		9/9/03	0 - 0.5	SVOC
FWS-167	CLNWR167		9/9/03	0 - 0.5	SVOC
FWS-168	CLNWR168		9/9/03	0 - 0.5	SVOC
FWS-176	CLNWR176		9/9/03	0 - 0.5	SVOC
FWS-177	CLNWR177		9/9/03	0 - 0.5	SVOC
FWS-178	CLNWR178		9/9/03	0 - 0.5	SVOC
FWS-189	CLNWR189		9/9/03	0 - 0.5	SVOC
FWS-190	CLNWR190		9/9/03	0 - 0.5	SVOC
FWS-191	CLNWR191		9/9/03	0 - 0.5	SVOC
FWS-192	CLNWR192		9/9/03	0 - 0.5	SVOC
FWS-193	CLNWR193		9/9/03	0 - 0.5	SVOC
FWS-194	CLNWR194		9/9/03	0 - 0.5	SVOC
FWS-195	CLNWR195		9/9/03	0 - 0.5	SVOC
FWS-196	CLNWR196		9/9/03	0 - 0.5	SVOC
FWS-220	CLNWR220		9/9/03	0 - 0.5	SVOC
FWS-221	CLNWR221		9/9/03	0 - 0.5	SVOC
FWS-222	CLNWR222		9/9/03	0 - 0.5	SVOC
FWS-229	CLNWR229		9/9/03	0 - 0.5	SVOC
FWS-230	CLNWR230		9/9/03	0 - 0.5	SVOC
FWS-231	CLNWR231		9/9/03	0 - 0.5	SVOC
FWS-233	CLNWR233		9/9/03	0 - 0.5	SVOC
FWS-234	CLNWR234		9/9/03	0 - 0.5	SVOC
LAP-021	LAP-0210		7/10/00	0 - 0.5	Explosives, SVOC
LAP-021	LAP-0211		7/10/00	0 - 0.5	Explosives, SVOC
LAP-021	LAP-021A		7/10/00	0 - 0.5	Explosives, SVOC
LAP-021	LAP-021B		7/10/00	1 - 1.5	Explosives, SVOC
LAP-022	LAP-022A		7/10/00	0 - 0.5	Explosives, SVOC
LAP-022	LAP-022B		7/10/00	1 - 1.5	Explosives, SVOC
LAP-023	LAP-023A		7/10/00	0 - 0.5	Explosives, SVOC
LAP-023	LAP-023B		7/10/00	1 - 1.5	Explosives, SVOC
LAP-024	LAP-024A		7/10/00	0 - 0.5	Explosives, SVOC
LAP-024	LAP-024B		7/10/00	1 - 1.5	Explosives, SVOC
LAP-025	LAP-025A		7/10/00	0 - 0.5	SVOC
LAP-025	LAP-025B		7/10/00	1 - 1.5	SVOC
LAP-026	LAP-026A		7/10/00	0 - 0.5	Explosives, SVOC
LAP-026	LAP-026B		7/10/00	1 - 1.5	Explosives, SVOC
LAP-027	LAP-027A		7/10/00	0 - 0.5	Explosives, SVOC
LAP-027	LAP-027B		7/10/00	1 - 1.5	Explosives, SVOC
LAP-028	LAP-028A		7/10/00	0 - 0.5	Explosives, SVOC
LAP-028	LAP-028B		7/10/00	1 - 1.5	Explosives, SVOC
LH-DL063-01	LH-DL063-01		8/5/93	1 - 1.5	SVOC
LH-DL064-01	LH-DL064-01		8/5/93	2 - 2.5	SVOC
LH-DL065-01	LH-DL065-01		8/5/93	1.5 - 2	SVOC
LH-DL072-01	LH-DL072-01		8/4/93	2 - 2.5	SVOC
LH-DL27-01	LH-DL27-01	c	6/24/93	1.5 - 2.5	SVOC
LH-DL29-01	LH-DL29-01	c	6/25/93	2 - 3	SVOC
LH-DL44-01	LH-DL44-01	c	7/10/93	2.1 - 2.8	SVOC
LH-DL45-01	LH-DL45-01	c	7/10/93	2.3 - 3	SVOC
LH-DL47-01	LH-DL47-01	c	7/9/93	0.5 - 1.5	SVOC
LH-DL50-01	LH-DL50-01	c	7/11/93	2 - 2.9	SVOC
LH-DL52-01	LH-DL52-01		8/3/93	1.3 - 1.7	SVOC
LH-DL53-01	LH-DL53-01	c	7/13/93	0 - 0	SVOC
LH-DL58-01	LH-DL58-01	c	6/26/93	2.1 - 2.9	SVOC
LH-DL61-01	LH-DL61-01	c	8/6/93	2 - 3	SVOC
LH-DL69-01	LH-DL69-01	c	6/26/93	2.5 - 3	SVOC
LH-DL71-01	LH-DL71-01	c	7/24/93	2 - 3	SVOC
LH-DL723-01	LH-DL723-01	c	6/26/93	1 - 2	SVOC
LH-DL73-01	LH-DL73-01	c	6/26/93	2 - 2.7	SVOC
LH-DL74-01	LH-DL74-01	c	6/26/93	2 - 2.7	SVOC
LH-DL75-01	LH-DL75-01	c	6/26/93	2 - 2.5	SVOC
LH-DL76-01	LH-DL76-01	c	6/26/93	2 - 2.5	SVOC
LH-DL77-01	LH-DL77-01	c	6/26/93	2 - 2.5	SVOC
LH-DL85-01	LH-DL85-01	c	6/26/93	2.5 - 3	SVOC
LH-DL91	LH-DL91	c	7/23/93	2.5 - 3	SVOC
LH-DL92-01	LH-DL92-01	c	7/23/93	2.5 - 3	SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
LH-DL93-01	LH-DL93-01	c	7/27/93	2.5 - 3	SVOC
LH-DL95-01	LH-DL95-01	c	6/26/93	2 - 2.5	SVOC
LH-S01-01	LH-S01-01_1		6/26/93	0.5 - 1.5	SVOC
LH-S01-02	LH-S01-02_1		6/26/93	0.5 - 1.5	SVOC
LH-S017-01	LH-S017-01_1	c	8/8/93	0.5 - 1.5	SVOC
LH-S017-01	LH-S017-01_2	c	8/8/93	2.5 - 3	SVOC
LH-S017-02	LH-S017-02_1	c	8/8/93	0.5 - 1	SVOC
LH-S017-02	LH-S017-02_2	c	8/8/93	2.5 - 3	SVOC
LH-S018-01	LH-S018-01_1	c	8/8/93	0.5 - 1.1	SVOC
LH-S018-01	LH-S018-01_2	c	8/8/93	1.1 - 1.6	SVOC
LH-S02-01	LH-S02-01_1		6/26/93	0.5 - 2.5	SVOC
LH-S02-02	LH-S02-02_1		6/26/93	0.5 - 2.5	SVOC
LH-S021-01	LH-S021-01_1	c	8/6/93	1 - 1.5	SVOC
LH-S021-02	LH-S021-02_1	c	8/6/93	0.5 - 1	SVOC
LH-S021-02	LH-S021-02_2	c	8/6/93	2 - 2.5	SVOC
LH-S025-01	LH-S025-01_1	c	8/6/93	0.5 - 1	SVOC
LH-S025-02	LH-S025-02_1	c	8/6/93	0.5 - 1	SVOC
LH-S025-02	LH-S025-02_2	c	8/6/93	1.5 - 2	SVOC
LH-S026-01	LH-S026-01_1	c	8/8/93	0.5 - 1	SVOC
LH-S026-02	LH-S026-02_1	c	8/8/93	0.5 - 1	SVOC
LH-S026-02	LH-S026-02_2	c	8/8/93	1 - 1.5	SVOC
LH-S03-01	LH-S03-01_1	c	7/10/93	0 - 2	SVOC
LH-S03-02	LH-S03-02_1	c	7/10/93	0 - 2	SVOC
LH-S04-01	LH-S04-01_1	c	7/9/93	0 - 2	SVOC
LH-S04-02	LH-S04-02_1	c	7/9/93	0 - 2	SVOC
LH-S05-01	LH-S05-01_1	c	7/9/93	0 - 2	SVOC
LH-S05-02	LH-S05-02_1	c	7/9/93	0 - 2	SVOC
LH-S06-01	LH-S06-01_1	c	7/9/93	0 - 2	SVOC
LH-S06-02	LH-S06-02_1	c	7/9/93	0 - 2	SVOC
LH-S062-01	LH-S062-01_1		8/5/93	0.5 - 1.2	SVOC
LH-S062-01	LH-S062-01_2		8/5/93	2.5 - 3	SVOC
LH-S063-01	LH-S063-01_1		8/5/93	1 - 1.5	SVOC
LH-S063-01	LH-S063-01_2		8/5/93	2 - 2.5	SVOC
LH-S063-01	LH-S063-01_3		8/5/93	2.5 - 3	SVOC
LH-S064-01	LH-S064-01_1		8/5/93	1.5 - 2	SVOC
LH-S064-01	LH-S064-01_3		8/5/93	0.5 - 1	SVOC
LH-S064-02	LH-S064-02_1		8/5/93	1 - 1.5	SVOC
LH-S064-02	LH-S064-02_2		8/5/93	2.5 - 3	SVOC
LH-S065-01	LH-S065-01_1		8/5/93	0.5 - 1	SVOC
LH-S065-01	LH-S065-01_2		8/5/93	2 - 2.5	SVOC
LH-S065-02	LH-S065-02_1		8/5/93	0.5 - 1	SVOC
LH-S07-01	LH-S07-01_1	c	6/25/93	0.5 - 2.5	SVOC
LH-S07-02	LH-S07-02_1	c	6/25/93	0 - 2	SVOC
LH-S07-02	LH-S07-02_2	c	6/25/93	2 - 4	SVOC
LH-S072-01	LH-S072-01_1		8/4/93	0.5 - 1	SVOC
LH-S072-02	LH-S072-02_1		8/4/93	0.5 - 1	SVOC
LH-S08-01	LH-S08-01_1	c	7/12/93	0 - 2	SVOC
LH-S08-02	LH-S08-02_1	c	7/12/93	0 - 2	SVOC
LH-S09-01	LH-S09-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S09-02	LH-S09-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S100-01	LH-S100-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S100-01	LH-S100-01_2	c	6/26/93	1.5 - 3	SVOC
LH-S10-01	LH-S10-01_1		6/26/93	0.5 - 2.5	SVOC
LH-S10-02	LH-S10-02_1	c	7/11/93	0 - 2	SVOC
LH-S101-01	LH-S101-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S102-01	LH-S102-01_1		8/3/93	0.5 - 2	SVOC
LH-S102-02	LH-S102-02_1		8/3/93	0.5 - 2	SVOC
LH-S103-01	LH-S103-01_1		7/24/93	0.5 - 2	SVOC
LH-S103-02	LH-S103-02_1		7/25/93	0.5 - 2	SVOC
LH-S104-01	LH-S104-01_1		8/3/93	1.5 - 2.5	SVOC
LH-S104-02	LH-S104-02_1		8/3/93	0.5 - 2	SVOC
LH-S105-01	LH-S105-01_1		8/3/93	0.5 - 2	SVOC
LH-S105-02	LH-S105-02_1		8/3/93	0.5 - 2	SVOC
LH-S107-01	LH-S107-01_2	c	6/26/93	1 - 1.5	SVOC
LH-S107-01	LH-S107-01_3	c	6/26/93	2 - 2.5	SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
LH-S108-01	LH-S108-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S108-01	LH-S108-01_2	c	6/26/93	2 - 2.5	SVOC
LH-S109-01	LH-S109-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S109-01	LH-S109-01_2	c	6/26/93	2 - 2.5	SVOC
LH-S110-01	LH-S110-01_1		8/4/93	0.5 - 2	SVOC
LH-S11-01	LH-S11-01_1		6/25/93	0 - 2	SVOC
LH-S11-02	LH-S11-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S111-01	LH-S111-01_1	c	7/8/93	0 - 2	SVOC
LH-S111-01	LH-S111-01_2	c	7/8/93	2 - 4	SVOC
LH-S112-01	LH-S112-01_1	c	7/8/93	0 - 2	SVOC
LH-S113-01	LH-S113-01_1	c	8/4/93	0.5 - 2	SVOC
LH-S117-01	LH-S117-01_1	c	8/4/93	0.5 - 2	SVOC
LH-S118-01	LH-S118-01_1	c	7/8/93	0 - 2	SVOC
LH-S118-01	LH-S118-01_2	c	7/8/93	2 - 4	SVOC
LH-S118-02	LH-S118-02_1	c	7/8/93	0 - 2	SVOC
LH-S118-02	LH-S118-02_2	c	7/8/93	2 - 4	SVOC
LH-S119-01	LH-S119-01_1		8/4/93	0.5 - 2	SVOC
LH-S119-02	LH-S119-02_1		8/4/93	0.5 - 2	SVOC
LH-S120-01	LH-S120-01_1		8/4/93	0.5 - 2	SVOC
LH-S120-02	LH-S120-02 _1		8/4/93	0.5 - 2	SVOC
LH-S12-01	LH-S12-01_1	c	7/11/93	0 - 2	SVOC
LH-S12-02	LH-S12-02_1	c	7/11/93	0 - 2	SVOC
LH-S121-01	LH-S121-01_1	c	8/4/93	0.5 - 1.5	SVOC
LH-S121-02	LH-S121-02_1	c	8/4/93	0.5 - 1.5	SVOC
LH-S122-01	LH-S122-01_1		8/3/93	0.5 - 1.2	SVOC
LH-S122-02	LH-S122-02_1		8/3/93	0.5 - 1	SVOC
LH-S123-01	LH-S123-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S13-01	LH-S13-01_1	c	7/10/93	0 - 2	SVOC
LH-S13-02	LH-S13-02_1	c	7/10/93	0 - 2	SVOC
LH-S14-01	LH-S14-01_1	c	7/8/93	0.5 - 1.5	SVOC
LH-S14-02	LH-S14-02_1	c	7/8/93	0.5 - 1.5	SVOC
LH-S15-01	LH-S15-01_1	c	7/8/93	0.5 - 1.5	SVOC
LH-S15-02	LH-S15-02_1	c	7/8/93	0.5 - 1.5	SVOC
LH-S16-01	LH-S16-01_1	c	7/8/93	0.5 - 1.5	SVOC
LH-S19-01	LH-S19-01	c	8/6/93	1 - 1.5	SVOC
LH-S19-01	LH-S19-01_1	c	8/6/93	1.5 - 2	SVOC
LH-S19-02	LH-S19-02_1	c	8/6/93	1 - 1.5	SVOC
LH-S20-01	LH-S20-01_1	c	6/25/93	0.5 - 2	SVOC
LH-S20-01	LH-S20-01_2	c	6/25/93	2 - 4	SVOC
LH-S20-02	LH-S20-02_1	c	6/25/93	0.5 - 2	SVOC
LH-S22-01	LH-S22-01_1	c	6/25/93	0.5 - 2.5	SVOC
LH-S22-02	LH-S22-02_1	c	6/25/93	0.5 - 2.5	SVOC
LH-S23-01	LH-S23-01_1	c	7/25/93	0.5 - 1	SVOC
LH-S23-02	LH-S23-02_1		7/25/93	1 - 1.5	SVOC
LH-S24-01	LH-S24-01_1	c	6/25/93	0.5 - 2	SVOC
LH-S24-01	LH-S24-01_2	c	6/25/93	2 - 4	SVOC
LH-S27-01	LH-S27-01_1	c	6/24/93	0.5 - 2	SVOC
LH-S27-02	LH-S27-02 _1	c	6/24/93	0.5 - 1.5	SVOC
LH-S29-01	LH-S29-01_1	c	6/25/93	0.5 - 2.5	SVOC
LH-S29-02	LH-S29-02_1	c	6/25/93	0 - 2	SVOC
LH-S29-02	LH-S29-02_2	c	6/25/93	2 - 4	SVOC
LH-S30-01	LH-S30-01_1	c	6/25/93	0.5 - 2.5	SVOC
LH-S31-01	LH-S31-01_1	c	7/21/93	0.5 - 1	SVOC
LH-S32-01	LH-S32-01_1	c	6/25/93	0.5 - 2.5	SVOC
LH-S33-01	LH-S33-01_1	c	7/21/93	0.5 - 1	SVOC
LH-S34-01	LH-S34-01_2	c	7/10/93	0.5 - 1.5	SVOC
LH-S35-01	LH-S35-01_1	c	6/25/93	0.5 - 2	SVOC
LH-S37-01	LH-S37-01_1	c	7/25/93	0.5 - 1	SVOC
LH-S38-01	LH-S38-01_1		6/26/93	0.5 - 1.5	SVOC
LH-S39-01	LH-S39-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S40-01	LH-S40-01_1		6/26/93	0.5 - 1.5	SVOC
LH-S41-01	LH-S41-01_1	c	6/25/93	0.5 - 1.5	SVOC
LH-S42-01	LH-S42-01_1	c	6/25/93	0.5 - 1.5	SVOC
LH-S42-01	LH-S42-01_2	c	6/25/93	2.5 - 3.3	SVOC
LH-S43-01	LH-S43-01_1	c	6/26/93	0.5 - 1	SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 7 of 13)

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
LH-S43-01	LH-S43-01_2	c	6/26/93	1.5 - 2	SVOC
LH-S44-01	LH-S44-01_1	c	7/10/93	0.5 - 1.5	SVOC
LH-S44-02	LH-S44-02_1	c	7/11/93	0.5 - 1.5	SVOC
LH-S45-01	LH-S45-01_1	c	7/10/93	0.5 - 1.5	SVOC
LH-S47-01	LH-S47-01_1	c	7/9/93	0.5 - 1.5	SVOC
LH-S47-01	LH-S47-01_2	c	7/9/93	2.2 - 3.2	SVOC
LH-S48-01	LH-S48-01_1	c	7/27/93	0.5 - 1	SVOC
LH-S48-02	LH-S48-02	c	7/27/93	0.5 - 1	SVOC
LH-S49-01	LH-S49-01_1	c	7/9/93	0.5 - 1.5	SVOC
LH-S50-01	LH-S50-01_1	c	7/28/93	0.5 - 1.5	SVOC
LH-S50-01	LH-S50-01_2	c	7/27/93	0.5 - 1.5	SVOC
LH-S51-01	LH-S51-01_1	c	7/11/93	0.5 - 1.5	SVOC
LH-S52-01	LH-S52-01_1		8/3/93	0.5 - 1	SVOC
LH-S52-01	LH-S52-01_2		8/3/93	1.5 - 2	SVOC
LH-S53-01	LH-S53-01_1	c	7/13/93	0.5 - 1.5	SVOC
LH-S53-02	LH-S53-02_1	c	7/13/93	0.5 - 1.5	SVOC
LH-S54-01	LH-S54-01_1	c	7/12/93	0 - 2	SVOC
LH-S55-01	LH-S55-01_1	c	7/12/93	0 - 2	SVOC
LH-S56-01	LH-S56-01_1	c	8/5/93	0.5 - 2	SVOC
LH-S57-01	LH-S57-01_1	c	7/22/93	0.5 - 1	SVOC
LH-S57-01	LH-S57-01_2	c	7/22/93	2 - 3	SVOC
LH-S57-02	LH-S57-02_1	c	7/22/93	0.5 - 1	SVOC
LH-S57-02	LH-S57-02_2	c	7/22/93	2 - 3	SVOC
LH-S58-01	LH-S58-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S59-01	LH-S59-01_1	c	7/21/93	0.5 - 1	SVOC
LH-S59-02	LH-S59-02_1	c	7/21/93	0.5 - 1	SVOC
LH-S60-01	LH-S60-01_1	c	7/22/93	0.5 - 1	SVOC
LH-S60-02	LH-S60-02_2	c	7/22/93	0.5 - 1	SVOC
LH-S60-02	LH-S60-02_3	c	7/22/93	2.5 - 3	SVOC
LH-S61-01	LH-S61-01_1	c	8/6/93	0.5 - 3	SVOC
LH-S61-02	LH-S61-02_1	c	8/6/93	1 - 3	SVOC
LH-S66-01	LH-S66-01_1	c	8/5/93	0.5 - 2	SVOC
LH-S66-02	LH-S66-02_1	c	8/5/93	0.5 - 2	SVOC
LH-S67-01	LH-S67-01_1	c	8/6/93	0.5 - 2	SVOC
LH-S68-01	LH-S68-01_1	c	8/6/93	0.5 - 2	SVOC
LH-S68-02	LH-S68-02	c	8/6/93	0.5 - 1.5	SVOC
LH-S69-01	LH-S69-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S69-02	LH-S69-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S70-01	LH-S70-01_1	c	7/24/93	0.5 - 2	SVOC
LH-S70-02	LH-S70-02_1	c	7/24/93	0.5 - 2	SVOC
LH-S71-01	LH-S71-01_1	c	7/24/93	1 - 1.5	SVOC
LH-S71-02	LH-S71-02_1	c	7/24/93	1 - 1.5	SVOC
LH-S723-01	LH-S723-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S723-02	LH-S723-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S73-01	LH-S73-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S75-01	LH-S75-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S75-02	LH-S75-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S76-01	LH-S76-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S76-01	LH-S76-01_2	c	6/26/93	2 - 2.5	SVOC
LH-S76-02	LH-S76-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S77-01	LH-S77-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S77-01	LH-S77-01_2	c	6/26/93	1.5 - 3	SVOC
LH-S77-02	LH-S77-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S77-02	LH-S77-02_2	c	6/26/93	2.5 - 3	SVOC
LH-S78-01	LH-S78-01_1	c	7/24/93	0.5 - 2	SVOC
LH-S79-01	LH-S79-01_1	c	7/24/93	0.5 - 2	SVOC
LH-S80-01	LH-S80-01_1	c	7/24/93	0.5 - 2	SVOC
LH-S81-01	LH-S81-01_1	c	7/23/93	0.5 - 2	SVOC
LH-S81-02	LH-S81-02_1	c	7/23/93	0.5 - 2	SVOC
LH-S82-01	LH-S82-01_1	c	7/23/93	0.5 - 2	SVOC
LH-S83-01	LH-S83-01_1	c	7/23/93	0.5 - 2	SVOC
LH-S83-02	LH-S83-02_1	c	7/23/93	0.5 - 2	SVOC
LH-S84-01	LH-S84-01_1	c	7/21/93	0.5 - 1.5	SVOC
LH-S86-02	LH-S86-02_1		7/27/93	0.5 - 2	SVOC
LH-S87-01	LH-S87-01_1	c	7/22/93	0.5 - 2	SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
LH-S87-01	LH-S87-01_2	c	6/26/93	2.5 - 3	SVOC
LH-S88-01	LH-S88-01_1	c	7/22/93	0.5 - 2	SVOC
LH-S88-02	LH-S88-02_1	c	7/22/93	0.5 - 2	SVOC
LH-S89-01	LH-S89-01_1	c	7/21/93	0.5 - 2	SVOC
LH-S89-02	LH-S89-02_1	c	7/21/93	0.5 - 2	SVOC
LH-S90-01	LH-S90-01_1	c	7/21/93	0.5 - 1.5	SVOC
LH-S90-02	LH-S90-02_1	c	7/21/93	0.5 - 2	SVOC
LH-S91-01	LH-S91-01_1	c	7/23/93	0.5 - 1	SVOC
LH-S91-02	LH-S91-02_1	c	7/24/93	0.5 - 1	SVOC
LH-S92-01	LH-S92-01_1	c	7/23/93	0.5 - 1	SVOC
LH-S92-02	LH-S92-02_1	c	7/23/93	0.5 - 1	SVOC
LH-S93-01	LH-S93-01_1	c	7/24/93	0.5 - 1	SVOC
LH-S93-02	LH-S93-02 _1	c	7/24/93	0.5 - 1	SVOC
LH-S94-01	LH-S94-01_1	c	8/20/93	0.5 - 1.5	SVOC
LH-S95-01	LH-S95-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S95-02	LH-S95-02_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S96-01	LH-S96-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S96-01	LH-S96-01_2	c	6/26/93	2 - 2.8	SVOC
LH-S97-01	LH-S97-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S98-01	LH-S98-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S98-01	LH-S98-01_2	c	6/26/93	1.5 - 3	SVOC
LH-S99-01	LH-S99-01_1	c	6/26/93	0.5 - 1.5	SVOC
LH-S99-01	LH-S99-01_2	c	6/26/93	2 - 2.8	SVOC
LHSMW01	LHS-MW1		9/30/94	0 - 0.5	SVOC
LHSMW02	LHS-MW2		9/30/94	0 - 0.5	SVOC
LHSMW03	LHS-MW3		9/30/94	0 - 0.5	SVOC
LHSMW04	LHS-MW4		9/30/94	0 - 0.5	SVOC
LHSMW05	LHS-MW5		9/30/94	0 - 0.5	SVOC
LHSMW06	LHS-MW6		9/30/94	0 - 0.5	SVOC
LHSMW07	LHS-MW7		9/30/94	0 - 0.5	SVOC
LHSMW08	LHS-MW8		9/30/94	0 - 0.5	SVOC
LHSMW09	LHS-MW9		9/30/94	0 - 0.5	SVOC
LHSMW10	LHS-MW10		9/30/94	0 - 0.5	SVOC
LHSMW11	LHS-MW11		9/30/94	0 - 0.5	SVOC
LHSMW12	LHS-MW12		9/30/94	0 - 0.5	SVOC
LHSMW13	LHS-MW13		9/30/94	0 - 0.5	SVOC
LHSMW14	LHS-MW14		9/30/94	0 - 0.5	SVOC
LHSMW15	LHS-MW15		9/30/94	0 - 0.5	SVOC
LHSMW16	LHS-MW16		9/30/94	0 - 0.5	SVOC
LHSMW17	LHS-MW17		9/30/94	0 - 0.5	SVOC
LHSMW18	LHS-MW18		9/30/94	0 - 0.5	SVOC
LHSMW19	LHS-MW19		9/30/94	0 - 0.5	SVOC
LHSMW20	LHS-MW20		10/3/94	0 - 0.5	SVOC
LHSMW21	LHS-MW21		10/3/94	0 - 0.5	SVOC
LHSMW22	LHS-MW22		10/3/94	0 - 0.5	SVOC
LHSMW23	LHS-MW23		10/3/94	0 - 0.5	SVOC
LHSMW24	LHS-MW24		10/3/94	0 - 0.5	SVOC
LHSMW25	LHS-MW25		10/3/94	0 - 0.5	SVOC
LHSMW26	LHS-MW26		10/3/94	0 - 0.5	SVOC
LHSMW27	LHS-MW27		10/3/94	0 - 0.5	SVOC
LHSMW28	LHS-MW28		10/3/94	0 - 0.5	SVOC
LHSMW29	LHS-MW29		10/3/94	0 - 0.5	SVOC
LHSMW30	LHS-MW30		10/3/94	0 - 0.5	SVOC
LHSMW31	LHS-MW31		10/4/94	0 - 0.5	SVOC
LHSMW32	LHS-MW32		10/4/94	0 - 0.5	SVOC
LHSMW33	LHS-MW33		10/4/94	0 - 0.5	SVOC
LHSMW34	LHS-MW34		10/4/94	0 - 0.5	SVOC
LHSMW35	LHS-MW35		10/4/94	0 - 0.5	SVOC
LHSMW36	LHS-MW36		10/4/94	0 - 0.5	SVOC
LHSMW37	LHS-MW37		10/4/94	0 - 0.5	SVOC
LHSMW38	LHS-MW38		10/4/94	0 - 0.5	SVOC
LHSMW39	LHS-MW39		10/4/94	0 - 0.5	SVOC
LHSMW40	LHS-MW40		10/4/94	0 - 0.5	SVOC
LHSMW41	LHS-MW41		10/4/94	0 - 0.5	SVOC
LHSMW42	LHS-MW42		10/4/94	0 - 0.5	SVOC

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
LHSMW43	LHS-MW43		10/5/94	0 - 0.5	SVOC
LHSMW44	LHS-MW44		10/5/94	0 - 0.5	SVOC
LHSMW45	LHS-MW45		10/5/94	0 - 0.5	SVOC
LHSMW46	LHS-MW46		10/5/94	0 - 0.5	SVOC
LHSMW47	LHS-MW47		10/5/94	0 - 0.5	SVOC
LHSMW48	LHS-MW48		10/5/94	0 - 0.5	SVOC
LHSMW49	LHS-MW49		10/5/94	0 - 0.5	SVOC
LHSMW50	LHS-MW50		10/5/94	0 - 0.5	SVOC
LHSMW51	LHS-MW51		10/5/94	0 - 0.5	SVOC
LHSMW52	LHS-MW52		10/5/94	0 - 0.5	SVOC
LHSMW53	LHS-MW53		10/5/94	0 - 0.5	SVOC
LHSMW54	LHS-MW54		10/5/94	0 - 0.5	SVOC
LHSMW55	LHS-MW55		10/5/94	0 - 0.5	SVOC
LHSMW56	LHS-MW56		10/5/94	0 - 0.5	SVOC
LHSMW57	LHS-MW57		10/5/94	0 - 0.5	SVOC
LHSMW58	LHS-MW58		10/5/94	0 - 0.5	SVOC
LHSMW59	LHS-MW59		10/5/94	0 - 0.5	SVOC
LHSMW60	LHS-MW60		10/5/94	0 - 0.5	SVOC
LHSMW61	LHS-MW61		10/5/94	0 - 0.5	SVOC
LHSMW62	LHS-MW62		10/5/94	0 - 0.5	SVOC
LHSMW63	LHS-MW63		10/5/94	0 - 0.5	SVOC
LHSMW64	LHS-MW64		10/5/94	0 - 0.5	SVOC
LHSMW65	LHS-MW65		10/5/94	0 - 0.5	SVOC
LHSMW66	LHS-MW66		10/5/94	0 - 0.5	SVOC
LHSMW67	LHS-MW67		10/5/94	0 - 0.5	SVOC
LHSMW68	LHS-MW68		10/5/94	0 - 0.5	SVOC
LHSMW69	LHS-MW69		10/5/94	0 - 0.5	SVOC
LHSMW70	LHS-MW70		10/5/94	0 - 0.5	SVOC
LHSMW71	LHS-MW71		10/5/94	0 - 0.5	SVOC
MAM-GP150-SS	MAM-GP150-SS		2/25/04	0 - 0.5	Explosives
MAM-P2212-SS	MAM-P2212-SS		2/25/04	0 - 0.5	Explosives
MAM-P2237-SS	MAM-P2237-SS		2/25/04	0 - 0.5	Explosives
MAM-P2268-SS	MAM-P2268-SS		2/25/04	0 - 0.5	Explosives
MAM-P2544-SS	MAM-P2544-SS		2/25/04	0 - 0.5	Explosives
MAM-P2571-SS	MAM-P2571-SS		2/25/04	0 - 0.5	Explosives
MAM-P2586-SS	MAM-P2586-SS		2/25/04	0 - 0.5	Explosives
MAM-W220-SS	MAM-W220-SS		2/24/04	0 - 0.5	Explosives
MAM-W250-SS	MAM-W250-SS		2/24/04	0 - 0.5	Explosives
Post-BERA Samples					
03SB01	03SB01-01-R	c	9/20/06	0.5 - 0.5	SVOC
03SB01	03SB01-02	c	8/29/06	0 - 0	SVOC
03SB02	03SB02-01	c	8/29/06	0 - 0.5	SVOC
03SB03	03SB03-01	c	8/29/06	0 - 0.5	SVOC
06SB01	06SB01-01		8/29/06	0 - 0	Explosives
06SB01	06SB01-02		8/29/06	0 - 0	Explosives
06SB02	06SB02-01		8/29/06	0 - 0	Explosives
06SB02	06SB02-02		8/29/06	0 - 0	Explosives
06SB03	06SB03-01		8/29/06	0 - 0	Explosives
06SB03	06SB03-02		8/29/06	0 - 0	SVOC
07SB01	07SB01(0-1)	c	6/29/06	0 - 1	SVOC
07SB02	07SB02(0-1)	c	6/29/06	0 - 1	SVOC
07SB03	07SB03(0-1)	c	6/28/06	0 - 1	SVOC
07SB04	07SB04(0-1)	c	6/28/06	0 - 1	SVOC
07SB06	07SB06(0-1)	c	6/29/06	0 - 1	SVOC
32SB14	L0001-32SB14		8/16/04	0 - 1	Explosives
32SB15	L0001-32SB15		8/16/04	0 - 1	Explosives
32SB16	L0001-32SB16		8/16/04	0 - 1	Explosives
32SB17	L0001-32SB17		8/17/04	0 - 1	Explosives
32SB18	L0001-32SB18		8/17/04	0 - 1	Explosives
32SB19	L0001-32SB19		8/17/04	0 - 1	Explosives
32SB20	L0001-32SB20		8/17/04	0 - 1	Explosives
32SB21	L0001-32SB21		8/17/04	0 - 1	Explosives
32SB22	L0001-32SB22		9/8/04	0 - 1	Explosives
32SB23	L0001-32SB23		9/8/04	0 - 1	Explosives

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No		Date	Depth (ft bgs)	Analyses [b]
35SUMP017-SB01	35-SMP17-SB01-01		9/11/06	0 - 0.5	Explosives
35SUMP022-SB01	35-SMP22-SB01-01	c	9/13/06	0.5 - 0.5	SVOC
35SUMP034-SB01	35-SMP34-SB01-01		9/11/06	0 - 0.5	Explosives
35SUMP034-SB02	35-SMP34-SB02-01		9/11/06	0 - 0.5	Explosives
35SUMP035-SB01	35-SMP35-SB01-01		9/12/06	0.5 - 0.5	Explosives
35SUMP035-SB02	35-SMP35-SB02-01		9/12/06	0 - 0.5	Explosives
35SUMP036-SB01	35-SMP36-SB01-01	c	9/12/06	0.5 - 0.5	SVOC
35SUMP036-SB02	35-SMP36-SB02-01	c	9/12/06	0.5 - 0.5	SVOC
35SUMP038-SB01	35-SMP38-SB01-01	c	9/12/06	0.5 - 0.5	SVOC
35SUMP038-SB01	35-SMP38-SB01-02	c	9/12/06	2.5 - 3	SVOC
35SUMP052-SB01	35-SMP052-SB01-01	c	9/19/06	0.5 - 0.5	SVOC
35SUMP052-SB01	35-SMP052-SB01-02	c	9/19/06	3 - 3	SVOC
35SUMP056-SB01	35-SMP056-SB01-01	c	9/22/06	0.5 - 0.5	SVOC
35SUMP056-SB01	35-SMP056-SB01-02	c	9/22/06	3 - 3	SVOC
35SUMP064-SB01	35-SMP064-SB01-01	c	9/20/06	1 - 1	SVOC
35SUMP074-SB01	35-SMP074-SB01-01	c	9/21/06	0.5 - 0.5	SVOC
35SUMP074-SB02	35-SMP074-SB02-01	c	9/21/06	0.5 - 0.5	SVOC
35SUMP088-SB01	35-SMP088-SB01-01	c	9/20/06	0.5 - 0.5	SVOC
35SUMP088-SB02	35-SMP088-SB02-01	c	9/20/06	0.5 - 0.5	SVOC
35SUMP107-SB01	35-SMP107-SB01-01		9/14/06	0.5 - 0.5	Explosives
35SUMP107-SB01	35-SMP107-SB01-02		9/14/06	3 - 3	Explosives
35SUMP107-SB02	35-SMP107-SB02-01		9/14/06	0.5 - 0.5	Explosives
35SUMP107-SB02	35-SMP107-SB02-02		9/14/06	3 - 3	Explosives
35SUMP118-SB01	35-SMP118-SB01-01		9/19/06	0.5 - 0.5	Explosives
35SUMP121-SB01	35-SMP121-SB01-01	c	9/14/06	0.5 - 0.5	SVOC
55SB02	55SB02-1-2		9/27/06	1 - 2	Explosives
55SB03	55-SB03-3.0		9/27/06	3 - 3	Explosives
55SB03	55-SB03-CONTENTS		9/27/06	0 - 0	Explosives
55SB03	55-SB03-1-2		9/27/06	1 - 2	Explosives
55SB04	55-SB04-1-2		9/27/06	1 - 2	Explosives
55SB05	55-SB05-1-2	c	9/28/06	1 - 2	SVOC
55SB05	55-SB05-2.5	c	9/28/06	2.5 - 2.5	SVOC
55SB06	55-SB06-(1-2)		9/27/06	1 - 2	Explosives
55SB07	55-SB07-(1-2)		9/27/06	1 - 2	Explosives
64SB01	64SB01-01	c	8/29/06	0.5 - 1	SVOC
64SB02	64SB02-01	c	8/29/06	0.5 - 1	SVOC
64SB03	64SB03-01	c	8/29/06	0.5 - 1	SVOC
68SB01	68SB01-01	c	8/30/06	0 - 0.5	SVOC
68SB01	68SB01-02	c	8/30/06	0.5 - 4	SVOC
68SB02	68SB02-01	c	8/30/06	0 - 0.5	SVOC
68SB02	68SB02-02	c	8/30/06	0.5 - 4	SVOC
68SB03	68SB03-01	c	8/30/06	0 - 0.5	SVOC
68SB03	68SB03-02	c	8/30/06	0.5 - 4	SVOC
WRS008-SB01	WRS008-SB01-01		9/14/06	0.5 - 0.5	Explosives
WRS008-SB02	WRS008-SB02-01		9/14/06	0.5 - 0.5	Explosives
WRS011-SB01	WRS011-SB01-01	c	9/26/06	0.5 - 0.5	SVOC
WRS011-SB02	WRS011-SB02-01	c	9/26/06	0.5 - 0.5	SVOC
WRS015-SB01	WRS-015-SB01-01	c	9/15/06	0.5 - 0.5	SVOC
WRS015-SB02	WRS-15-SB02-01	c	9/15/06	1 - 1	SVOC
WRS019-SB01	WRS019-SB01-01		9/14/06	1.5 - 1.5	Explosives
WRS019-SB02	WRS019-SB02-01		9/25/06	0.5 - 0.5	Explosives
WRS021-SB01	WRS021-SB01-01		9/26/06	0.5 - 0.5	Explosives
WRS021-SB02	WRS021-SB02-01		9/26/06	0.5 - 0.5	Explosives
WRS04-SB01	WRS04-SB01-01	c	9/25/06	0.5 - 0.5	SVOC
WRS06-SB01	WRS06-SB01-01	c	9/25/06	0.5 - 0.5	SVOC
WRS07-SB01	WRS07-SB01-01	c	9/25/06	0.5 - 0.5	SVOC
WRS07-SB02	WRS07-SB02-01	c	9/25/06	0.5 - 0.5	SVOC
WRS09-SB01	WRS09-SB01-01	c	9/15/06	1 - 1	SVOC
WRS09-SB02	WRS09-SB02-01	c	9/15/06	0.5 - 0.5	SVOC
WRS10-SB02	WRS10-SB02-01		9/25/06	0.5 - 0.5	Explosives
WRS14-SB01	WRS14-SB01-01		9/14/06	1.5 - 1.5	Explosives
WRSUMP005-SB01	WRSMP005-SB01-01		9/22/06	0.5 - 0.5	Explosives
Additional Samples ("CAPE" Samples) [d]					
BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A		9/7/06	0 - 0.5	Explosives

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No	Date	Depth (ft bgs)	Analyses [b]
BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	9/7/06	0 - 0.5	Explosives
Data Gaps (Replacement) Samples				
01ASB02R	01ASB02R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
01ASB02R	01ASB02R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
01ASB04R	01ASB04R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
01ASB04R	01ASB04R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
01SB23R	01SB23R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
01SB23R	01SB23R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
01SB28R	01SB28R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
01SB28R	01SB28R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
01SD09R	01SD09R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
01SD09R	01SD09R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
29SB05R	29SB05R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29SB05R	29SB05R-SB(.5-3)	10/22/13	0.5 - 3	Explosives
29SB07R	29SB07R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29SB07R	29SB07R-SB(.5-3)	10/22/13	0.5 - 3	Explosives
29SB08R	29SB08R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29SB08R	29SB08R-SS(.5-3)	10/22/13	0.5 - 3	Explosives
29SB09R	29SB09R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29SB09R	29SB09R-SB(.5-3)	10/22/13	0.5 - 3	Explosives
29SB11R	29SB11R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29SB11R	29SB11R-SB(.5-3)	10/22/13	0.5 - 3	Explosives
29SB12R	29SB12R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
29SB12R	29SB12R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
29SB13R	29SB13R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
29SB13R	29SB13R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
29SB14R	29SB14R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
29SB14R	29SB14R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
29SB15R	29SB15R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
29SB15R	29SB15R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
29SD01R	29SD01R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29SD01R	29SD01R-SB(.5-3)	10/22/13	0.5 - 3	Explosives
29SD10R	29SD10R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29SD10R	29SD10R-SB(.5-3)	10/22/13	0.5 - 3	Explosives
29WL02R	29WL02R-SS(0-.5)	10/22/13	0 - 0.5	Explosives
29WL02R	29WL02R-SB(.5-3)	10/22/13	0.5 - 3	Explosives
32SB03R	32SB03R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
32SB03R	32SB03R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
32SB06R	32SB06R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
32SB06R	32SB06R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
32SB13R	32SB13R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
32SB13R	32SB13R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
32SB14R	32SB14R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
32SB14R	32SB14R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
32SD06R	32SD06R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
32SD06R	32SD06R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
32SS03R	32SS03R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
32SS03R	32SS03R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
32SS04R	32SS04R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
32SS04R	32SS04R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
32WL01R	32WL01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
32WL01R	32WL01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
46SD02R-SB	46SD02R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
46SD02R-SS	46SD02R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
DL45-01R	DL45-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
DL45-01R	DL45-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
DL74-01R	DL74-01R-SS(0-0.4)	10/26/13	0 - 0.5	Explosives
DL74-01R	DL74-01R-SB(.5-2.2)	10/26/13	0.5 - 2.2	Explosives
DL75-01R	DL75-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
DL75-01R	DL75-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S021-01R	S021-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S021-01R	S021-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S025-01R	S025-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S025-01R	S025-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No	Date	Depth (ft bgs)	Analyses [b]
LH-S026-01R	S026-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S026-01R	S026-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S05-01R	S05-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S05-01R	S05-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S06-01R	S06-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S06-01R	S06-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S08-01R	S08-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S08-01R	S08-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S100-01R	S100-01R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
LH-S100-01R	S100-01R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
LH-S10-01R	S10-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S10-01R	S10-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S11-01R	S11-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S11-01R	S11-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S111-01R	S111-01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S111-01R	S111-01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S112-01R	S112-01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S112-01R	S112-01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S113-01R	S113-01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S113-01R	S113-01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S117-01R	S117-01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S117-01R	S117-01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S12-01R	S12-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S12-01R	S12-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S121-01R	S121-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S121-01R	S121-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S14-02R	S14-02R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S14-02R	S14-02R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S16-01R	S16-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S16-01R	S16-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S19-01R	S19-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S19-01R	S19-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S22-01R	S22-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S22-01R	S22-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S27-01R	S27-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S27-01R	S27-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S29-01R	S29-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S29-01R	S29-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S30-01R	S30-01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S30-01R	S30-01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S32-01R	S32-01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S32-01R	S32-01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S41-01R	S41-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S41-01R	S41-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S43-01R	S43-01R-SS(0-.5)	10/28/13	0 - 0.5	Explosives
LH-S43-01R	S43-01R-SB(.5-3)	10/28/13	0.5 - 3	Explosives
LH-S44-01R	S44-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S44-01R	S44-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S47-01R	S47-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S47-01R	S47-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S48-01R	S48-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S48-01R	S48-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S49-01R	S49-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S49-01R	S49-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S50-01R	S50-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S50-01R	S50-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S55-01R	S55-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S55-01R	S55-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S58-01R	S58-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S58-01R	S58-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S59-01R	S59-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S59-01R	S59-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S61-01R	S61-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S61-01R	S61-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S71-01R	S71-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives

Table 3
Sample Summary for the Revised Dataset for Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample No	Date	Depth (ft bgs)	Analyses [b]
LH-S71-01R	S71-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S723-01R	S723-01R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LH-S723-01R	S723-01R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LH-S73-01R	S73-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S73-01R	S73-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S77-01R	S77-01R-SS(0-.5)	10/26/13	0 - 0.5	Explosives
LH-S77-01R	S77-01R-SB(.5-3)	10/26/13	0.5 - 3	Explosives
LH-S82-01R	S82-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S82-01R	S82-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S83-01R	S83-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S83-01R	S83-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S86-01R	S86-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S86-01R	S86-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S88-01R	S88-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S88-01R	S88-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S89-02R	S89-02R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S89-02R	S89-02R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S92-01R	S92-01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S92-01R	S92-01R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S93-01R	S93-1R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
LH-S93-01R	S93-1R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
LH-S94-01R	S94-01R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
LH-S94-01R	S94-01R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
LH-S95-01R	S95-01R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
LH-S95-01R	S95-01R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
LH-S97-01R	S97-01R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
LH-S97-01R	S97-01R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
LH-S98-01R	S98-01R-SS(0-.5)	10/29/13	0 - 0.5	Explosives
LH-S98-01R	S98-01R-SB(.5-3)	10/29/13	0.5 - 3	Explosives
LHSMW01R	LHSMW01R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
LHSMW01R	LHSMW01R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
LHSMW02R	LHSMW02R-SS(0-.5)	10/23/13	0 - 0.5	Explosives
LHSMW02R	LHSMW02R-SB(.5-3)	10/23/13	0.5 - 3	Explosives
LHSMW67R	LHSMW67R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LHSMW67R	LHSMW67R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LHSMW68R	LHSMW68R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LHSMW68R	LHSMW68R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LHSMW69R	LHSMW69R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LHSMW69R	LHSMW69R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LHSMW70R	LHSMW70R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LHSMW70R	LHSMW70R-SB(.5-3)	10/25/13	0.5 - 3	Explosives
LHSMW71R	LHSMW71R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
LHSMW71R	LHSMW71R-SB(.5-3)	10/25/13	0.5 - 3	Explosives

[a] Total soil is defined as samples 0 to 3 feet bgs. Deeper samples were also considered surface soil if at least 50% of their sampling depth interval was less than 3 ft bgs (e.g., 2 to 4 ft bgs). Field duplicate samples are not included.

[b] Only analytical data containing explosives compounds are presented for these samples. Additional analyses may also have been performed on the sample.

[c] Additional data identified in the historical investigations that were not included in the Data Gaps Memorandum.

[d] CAPE, 2007, *Engineering Evaluation/Cost Analysis, Longhorn Army Ammunition Plant, Karnack, Texas,* Final, October.

SVOC = Semivolatile organic compounds that include one or more explosives compounds (e.g., 2,4- and 2,6-dinitrotoluene, nitrobenzene, etc.)

Table 4
Statistical Summary of the Revised BERA Dataset
TotalSoil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas

Chemical	Detection Frequency	Percent Hits	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Maximum	VQ	Reporting Limits Minimum	Maximum	Mean mg/kg	Statistical Distribution [b]		95% UCL mg/kg [b]	Revised Dataset EPC mg/kg [c]	BERA EPC mg/kg [c]	ESV mg/kg [d]		HQ_{SCREEN} [e]	COPEC? [f,g]
Nitroaromatics																		
1,3,5-Trinitrobenzene	4 / 321	1.2	3.41E-01		2.85E+01		1.50E-01	2.58E-01	2.25E-01	Normal		4.39E-01	**4.39E-01**	4.13E-01	0.376		1.17	No (b)
1,3-Dinitrobenzene	2 / 321	0.6	8.30E-01		6.13E+00	JH	5.00E-02	2.58E-01	1.18E-01	Nonparametric	*	1.38E-01	**1.38E-01**	1.18E-01	0.655		0.21	No (a)
2,4,6-Trinitrotoluene	6 / 321	1.9	3.90E+00		5.70E+04		1.00E-01	1.60E+02	1.79E+02	Lognormal		1.03E+03	**1.03E+03**	4.12E+02	30		34.2	No (b)
2,4-Dinitrotoluene [h]	3 / 617	0.5	1.20E+00		8.21E+01		2.61E-02	3.46E+00	2.92E-01	Normal		4.43E-01	**4.43E-01**	2.17E-01	1.28		0.35	No (a)
2,6-Dinitrotoluene [h]	8 / 614	1.3	1.09E-01	J	7.30E-01		2.61E-02	3.46E+00	1.45E-01	Nonparametric		3.86E-02	3.86E-02	**1.11E-01**	0.0328		1.18	No (b)
2-Amino-4,6-dinitrotoluene	2 / 321	0.6	2.54E-01		2.60E+00	J	5.00E-02	2.60E-01	1.05E-01	Nonparametric		1.08E-01	1.08E-01	**3.59E-01**	80		0.001	No (a)
4-Amino-2,6-dinitrotoluene	1 / 321	0.3	2.89E-01		2.89E-01		5.00E-02	5.00E-01	1.14E-01	Nonparametric	*	1.22E-01	1.22E-01	**2.72E-01**	80		0.002	No (a)
4-Nitrotoluene	1 / 321	0.3	2.92E+00		2.92E+00		1.00E-01	5.00E-01	1.25E-01	Nonparametric	*	1.35E-01	**1.35E-01**	ND	22	(1)	0.01	No (a)
Nitrobenzene [h]	1 / 815	0.1	1.10E+00		1.10E+00		2.61E-02	3.46E+00	1.62E-01	Nonparametric	*	1.72E-01	**1.72E-01**	1.62E-01	40		0.004	No (a)
Tetryl	1 / 275	0.4	9.49E-01	J	9.49E-01	J	1.00E-01	6.50E-01	1.39E-01	Nonparametric	*	1.49E-01	**1.49E-01**	ND	25		0.01	No (a)

[a] The revised dataset includes the original BERA dataset with the rejected data removed and replaced with data gaps samples data. Total soil is defined as samples 0 to 3 feet below ground surface (bgs). Deeper samples were also considered total soil if at least 50% of their sampling depth interval was less than 3 ft bgs (e.g., 2-4 ft bgs).

[b] U.S. Environmental Protection Agency (EPA), 2013, ProUCL Version 5.0.00, Technical Support Center, Office of Science Policy, Atlanta, Georgia, September, on line at http://www.epa.gov/osp/hstl/tsc/software.htm.. UCLs for COPECs with low detection frequencies were calculated using a bootstrap calculation and are noted with an asterisk (*).

[c] The EPC is the 95% UCL, or the MDC if sample size is five or less. The screening concentration for the revised revised dataset is presented in the first column, and the EPC calculated in the BERA (see Table 6-17 in Shaw, 2007) is in the second column. The higher of the two values is shaded.

[d] The ESV is the same as was used in the BERA (Shaw, 2007), unless otherwise noted. See Table 1.
(1) no ESV was identified in the BERA. Screening value obtained from Los Alamos National Laboratory (LANL), Eco Risk Database, Release 3.1, October 2012.

[e] The HQ_{screen} is calculated by dividing the Revised Dataset EPC by the ESV.

[f] No = Chemical is not chosen as a COPEC; Yes = Chemical is chosen as a COPEC.

[g] Rationale for exclusion of chemical as a COPEC:
(a) = screening concentration is less than the ESV; therefore the HQ_{screen} is less than 1
(b) detection frequency is less than 3 percent, or if 3% < FOD < 5% results of spatial evaluation demonstrate no hot spot.

[h] Analysis of chemical was performed by two different methods. Dataset consists of a comibination of data from the two methods. See text for details.

BERA = baseline ecological risk assessment
COPEC = chemical of potential ecological concern
EPC = exposure point concentration
ESV = ecological screening value
HQ_{screen} = screening-level hazard quotient
MDC = maximum detected concentration
ND = Not detected in BERA dataset. The sole detection of this chemical was in the Post-BERA dataset.
mg/kg = milligrams per kilogram
UCL = upper confidence limit on the mean

Table 5
Statistical Summary of the 2013 Replacement Sample Data
Total Soil [a]
Industrial Sub-Area
Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas

Chemical	Detection Frequency	Percent Hits	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Detected Concentrations Maximum	VQ	Reporting Limits Minimum	Reporting Limits Maximum	Mean mg/kg	Statistical Distribution [b]	95% UCL mg/kg [b]	EPC mg/kg [c]	ESV mg/kg [d]	HQ_{SCREEN}	COPEC? [e,f]
Nitroaromatics															
1,3,5-Trinitrobenzene	1 / 170	0.6	0.341		0.341		0.227	0.257	1.22E-01	NC	NC	3.41E-01	0.376	0.91	No (a)
2,4,6-Trinitrotoluene	1 / 170	0.6	14.7		14.7		0.227	1.19	2.06E-01	NC	NC	1.47E+01	30	0.49	No (a)
2,6-Dinitrotoluene	7 / 170	4.1	0.109	J	0.181	J	0.227	0.257	1.21E-01	Normal	0.155	1.55E-01	0.0328	4.73	No (b)
2-Amino-4,6-dinitrotoluene	1 / 170	0.6	0.254		0.254		0.227	0.257	1.21E-01	NC	NC	2.54E-01	80	0.003	No (a)
4-Amino-2,6-dinitrotoluene	1 / 170	0.6	0.289		0.289		0.227	0.257	1.21E-01	NC	NC	2.89E-01	80	0.004	No (a)

[a] Dataset used includes only the 2013 data gaps samples data. Total soil is defined as samples 0 to 3 feet below ground surface (bgs).
Deeper samples were also considered total soil if at least 50% of their sampling depth interval was less than 3 ft bgs (e.g., 2-4 ft bgs).

[b] U.S. Environmental Protection Agency (EPA), 2013, ProUCL Version 5.0.00, Technical Support Center, Office of Science Policy, Atlanta, Georgia, September, on line at http://www.epa.gov/osp/hstl/tsc/software.htm.

[c] The EPC used to calculate the HQ_{screen} is the 95% UCL, if calculated. Because the MDC was below the ESV for all chemicals except 2,6-dinitrotoluene (DNT), the 95% UCL was only calculated for 2,6-DNT.

[d] The ESV is the same as was used in the BERA (Shaw, 2007), unless otherwise noted. See Table 1.

[e] No = Chemical is not chosen as a COPEC; Yes = Chemical is chosen as a COPEC.

[f] Rationale for exclusion of chemical as a COPEC:
(a) = screening concentration is less than the ESV; therefore the HQ_{screen} is less than 1
(b) detection frequency is less than 3 percent, or if 3% < FOD < 5% results of spatial evaluation demonstrate no hot spot.

COPEC = chemical of potential ecological concern
EPC = exposure point concentration
ESV = ecological screening value
HQ_{screen} = screening-level hazard quotient
MDC = maximum detected concentration
NC = not calculated; because the single detected concentration was less than the ESV, no UCL calculation was performed.
mg/kg = milligrams per kilogram
UCL = upper confidence limit on the mean

Table 6
Sample Summary for the Revised Dataset for Soil[a]
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 1 of 3)

Location	Sample No	Date	Depth (ft bgs)	Analyses[b]
BERA Samples				
12SB01	12SB01(1.0-2.0)	6/1/93	1 - 2	SVOC
12WW01	12WW01(0-2)	4/27/93	0 - 2	SVOC
12WW02	12WW02(0-2)	2/4/88	0 - 2	SVOC
12WW02	C900204-12WW02-N02	2/4/90	0 - 2	SVOC
12WW02	C930428-12WW02-N02	4/28/93	0 - 2	SVOC
12WW05	12WW05(0-1.5)	4/19/93	0 - 1.5	SVOC
12WW07	12WW07(0-2)	4/19/93	0 - 2	SVOC
16SD02	16SD02(0-1)	4/14/93	0 - 1	SVOC
16WW27	16WW27(0-0.5)	5/17/97	0 - 0.5	Explosives
16WW27	16WW27(1-3)	5/17/97	1 - 3	Explosives
16WW31	16WW31(0-0.5)	5/29/97	0 - 0.5	Explosives
16WW31	16WW31(1-3)	5/29/97	1 - 3	Explosives
16WW35	16WW35(0-0.5)	6/25/97	0 - 0.5	Explosives
16WW35	16WW35(1-3)	6/25/97	1 - 3	Explosives
16WW37	16WW37(0-0.5)	5/31/97	0 - 0.5	Explosives
16WW37	16WW37(1-3)	5/31/97	1 - 3	Explosives
17SB01	17SB01(02)	5/15/93	2.5 - 2.5	SVOC
17SB01	17SB01(0-2)	5/15/93	0 - 2	SVOC
17SB02	17SB02(0-2)	5/15/93	0 - 2	SVOC
17SB03	17SB03(0-2)	5/16/93	0 - 2	SVOC
17SB04	17SB04(0-2)	5/15/93	0 - 2	SVOC
17SB05	17SB05(0-2)	5/16/93	0 - 2	SVOC
17SB06	17SB06(0-2)	5/15/93	0 - 2	SVOC
17SB07	17SB07(0-2)	5/16/93	0 - 2	SVOC
17SD01	17SD01	4/21/93	0 - 0	SVOC
17SD02	17SD02	4/21/93	0 - 0	SVOC
17SD10	17SD10	9/17/98	0 - 0	Explosives, SVOC
17SD11	17SD11	9/17/98	0 - 0	Explosives
17SD12	17SD12	9/17/98	0 - 0	Explosives, SVOC
17SS21	17SS21(0-0.5)	7/11/98	0 - 0.5	Explosives
17SS21	17SS21(2.5-3)	7/11/98	2.5 - 3	Explosives
17SS22	17SS22(0-0.5)	7/11/98	0 - 0.5	Explosives, SVOC
17SS22	17SS22(1-3)-980711	7/11/98	1 - 3	Explosives, SVOC
17SS23	17SS23(0-0.5)	7/11/98	0 - 0.5	Explosives
17SS23	17SS23(2.5-3)	7/11/98	2.5 - 3	Explosives
17SS24	17SS24(0-0.5)	7/11/98	0 - 0.5	Explosives
17SS24	17SS24(2.5-3)	7/11/98	2.5 - 3	Explosives
17SS25	17SS25(0-0.5)	7/11/98	0 - 0.5	Explosives
17SS25	17SS25(2.5-3)	7/11/98	2.5 - 3	Explosives
17SS26	C-17SS26(0-0.5)-9807	7/11/98	0 - 0.5	Explosives, SVOC
17SS26	C-17SS26(1-3)-980711	7/11/98	1 - 3	Explosives, SVOC
17SS27	17SS27(0-0.5)	7/11/98	0 - 0.5	Explosives
17SS27	17SS27(2.5-3)	7/11/98	2.5 - 3	Explosives
17SS28	17SS28(0-0.5)	7/11/98	0 - 0.5	Explosives
17SS28	17SS28(2.5-3)	7/11/98	2.5 - 3	Explosives
17SS29	17SS29(0-0.5)	7/11/98	0 - 0.5	Explosives
17SS29	17SS29(2.5-3)	7/11/98	2.5 - 3	Explosives
17SS31	17SS31(0-0.5)	7/14/98	0 - 0.5	Explosives
17SS31	17SS31(2.5-3)	7/14/98	2.5 - 3	Explosives
17WW01	17WW01(0-2)	5/16/93	0 - 2	SVOC
18SD03	18SD03(0-0.5)	5/2/93	0 - 0.5	SVOC
18SD04	18SD04(0-0.5)	5/2/93	0 - 0.5	SVOC
18SD05	18SD05(0-0.5)	5/2/93	0 - 0.5	SVOC
18SD06	18SD06(0-0.5)	5/2/93	0 - 0.5	SVOC
18SD07	18SD07(0-0.5)	5/2/93	0 - 0.5	SVOC
18SD08	18SD08(0-0.5)	5/2/93	0 - 0.5	SVOC
18SD29	18SD29	10/7/98	0 - 0	Explosives, SVOC

Table 6
Sample Summary for the Revised Dataset for Soil[a]
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 2 of 3)

Location	Sample No		Date	Depth (ft bgs)	Analyses[b]
COE17-02	COE17-02-01		9/1/98	0 - 0.5	Explosives
COE17-03	COE17-03-01		9/1/98	0 - 0.5	Explosives
COE17-04	COE17-04-01		9/1/98	0 - 0.5	Explosives
COE17-05	COE17-05-01		9/1/98	0 - 0.5	Explosives
COE17-06	COE17-06-01		9/1/98	0 - 0.5	Explosives
COE17-07	COE17-07-01		9/1/98	0 - 0.5	Explosives
COE17-08	COE17-08-01		9/1/98	0 - 0.5	Explosives
COE17-09	COE17-09-01		9/1/98	0 - 0.5	Explosives
COE17-10	COE17-10-01		9/1/98	0 - 0.5	Explosives
COE17-11	COE17-11-01		9/1/98	0 - 0.5	Explosives
COE17-12	COE17-12-01		9/1/98	0 - 0.5	Explosives
COE17-13	COE17-13-01		9/1/98	0 - 0.5	Explosives
COE17-14	COE17-14-01		9/1/98	0 - 0.5	Explosives
COE17-15	COE17-15-01		9/1/98	0 - 0.5	Explosives
COE17-16	COE17-16-01		9/1/98	0 - 0.5	Explosives
FWS-088	CLNWR088		9/9/03	0 - 0.5	SVOC
FWS-101	CLNWR101		9/9/03	0 - 0.5	SVOC
FWS-108	CLNWR108		9/9/03	0 - 0.5	SVOC
FWS-119	CLNWR119		9/9/03	0 - 0.5	SVOC
FWS-123	CLNWR123		9/9/03	0 - 0.5	SVOC
FWS-124	CLNWR124		9/9/03	0 - 0.5	SVOC
LH-S115-01	LH-S115-01_1		8/4/93	0.5 - 1	SVOC
LH-S115-02	LH-S115-02_1		8/4/93	0.6 - 2.6	SVOC
Post-BERA Samples					
35SUMP114-SB01	35-SMP114-SB01-01		9/15/06	0.5 - 0.5	Explosives
35SUMP114-SB01	35-SMP114-SB01-02		9/15/06	0.5 - 0.5	Explosives
35SUMP115-SB01	35-SMP115-SB01-01		9/19/06	0.5 - 0.5	Explosives
35SUMP116-SB01	35-SMP116-SB01-01	c	9/15/06	0.5 - 0.5	SVOC
35SUMP116-SB02	35-SMP116-SB02-01	c	9/19/06	0.5 - 0.5	SVOC
LHAAP-17 Post-BERA Samples[d]					
17EXC01-SB01	17EXC01-SB01(0-2)		9/16/10	0 - 2	Explosives
17EXC01-SB01	17EXC01-SB01(2-4)		9/16/10	2 - 4	Explosives
17EXC01-SB02	17EXC01-SB02(0-2)		9/16/10	0 - 2	Explosives
17EXC01-SB02	17EXC01-SB02(2-4)		9/16/10	2 - 4	Explosives
17EXC01-SB03	17EXC01-SB03(0-2)		9/16/10	0 - 2	Explosives
17EXC01-SB03	17EXC01-SB03(2-4)		9/16/10	2 - 4	Explosives
17EXC01-SB04	17EXC01-SB04(0-2)		9/16/10	0 - 2	Explosives
17EXC01-SB04	17EXC01-SB04(2-4)		9/16/10	2 - 4	Explosives
17EXC01-SB05	17EXC01-SB05(0-2)		9/16/10	0 - 2	Explosives
17EXC02-SB01	17EXC02-SB01(0-2)		8/31/10	0 - 2	Explosives
17EXC02-SB02	17EXC02-SB02(0-2)		8/31/10	0 - 2	Explosives
17EXC02-SB03	17EXC02-SB03(0-2)		8/31/10	0 - 2	Explosives
17EXC02-SB04	17EXC02-SB04(0-2)		9/16/10	0 - 2	Explosives
17EXC02-SB04	17EXC02-SB04(2-3)		9/16/10	2 - 4	Explosives
17EXC02-SB05	17EXC02-SB05(2-4)		9/16/10	2 - 4	Explosives
17EXC02-SB06	17EXC02-SB06(0-2)		8/31/10	0 - 2	Explosives
17EXC03-SB01	17EXC03-SB01(0-2)		8/30/10	0 - 2	Explosives
17EXC03-SB02	17EXC03-SB02(0-2)		8/31/10	0 - 2	Explosives
17EXC03-SB02	17EXC03-SB02(2-3)		8/30/10	0 - 3	Explosives
17EXC03-SB03	17EXC03-SB03(0-2)		8/31/10	0 - 2	Explosives
17EXC03-SB03	17EXC03-SB03(2-4)		8/31/10	2 - 4	Explosives
17EXC03-SB08	17EXC03-SB08(0-2)		8/31/10	0 - 2	Explosives
17EXC03-SB08	17EXC03-SB08(2-4)		8/31/10	2 - 4	Explosives
17EXCO3-SB04	17EXCO3-SB04(0-2)		9/15/10	0 - 2	Explosives
17EXCO3-SB04	17EXCO3-SB04(2-4)		9/15/10	2 - 4	Explosives
17EXCO3-SB05	17EXCO3-SB05(0-2)		9/15/10	0 - 2	Explosives
17EXCO3-SB05	17EXCO3-SB05(2-4)		9/15/10	2 - 4	Explosives

Table 6
Sample Summary for the Revised Dataset for Soil[a]
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas
(Page 3 of 3)

Location	Sample No	Date	Depth (ft bgs)	Analyses[b]
17EXCO3-SB06	17EXCO3-SB06(0-2)	9/15/10	0 - 2	Explosives
17EXCO3-SB06	17EXCO3-SB06(2-4)	9/15/10	2 - 4	Explosives
17EXCO3-SB07	17EXCO3-SB07(0-2)	9/15/10	0 - 2	Explosives
17EXCO3-SB07	17EXCO3-SB07(2-4)	9/15/10	2 - 4	Explosives
17SB-B02	17SB-B02(0-2)	8/30/10	0 - 2	Explosives
17SB-B04	17SB-B04(0-2)	8/30/10	0 - 2	Explosives
17SB-C04	17SB-C04(0-2)	8/30/10	0 - 2	Explosives
17SB-C05	17SB-C05(0-2)	8/31/10	0 - 2	Explosives
17SB-C05	17SB-C05(2.5-3.5)	8/31/10	2.5 - 3.5	Explosives
17SB-D02	17SB-D02(0-2)	8/27/10	0 - 2	Explosives
17SB-D03	17SB-D03(0-2)	8/27/10	0 - 2	Explosives
17SB-D04	17SB-D04(0-2)	8/27/10	0 - 2	Explosives
Data Gaps (Replacement) Samples				
12SB01R	12SB01(DS)R-SB(.5-3)	10/27/13	0.5 - 3	Explosives
12WW01R	12WW01R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
12WW02R	12WW02R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
12WW05R	12WW05R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
12WW07R	12WW07R-SS(0-.5)	10/27/13	0 - 0.5	Explosives
16SD02R	16SD02R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
18SD03R	18SD03R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
18SD04R	18SD04R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
18SD05R	18SD05R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
18SD06R	18SD06R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
18SD07R	18SD07R-SS(0-.5)	10/25/13	0 - 0.5	Explosives
18SD08R	18SD08R-SS(0-.5)	10/25/13	0 - 0.5	Explosives

[a] Total soil is defined as samples 0 to 3 feet bgs. Deeper samples were also considered surface soil if at least 50% of their sampling depth interval was less than 3 ft bgs (e.g., 2 to 4 ft bgs). Field duplicate samples are not included.

[b] Only analytical data containing explosives compounds are presented for these samples. Additional analyses may also have been performed on the sample.

[c] Additional data identified in the historical investigaitons that were not included in the Data Gaps Memorandum.

[d] Additional samples collected at LHAAP-17 since the ecological risk assessment was finalized. Only samples in the depth range appropriate for ecological risk assessment (see footnote a) are shown.

SVOC = Semivolatile organic compounds that include one or more explosives compounds (e.g., 2,4- and 2,6-dinitrotoluene, nitrobenzene, etc.)

Table 7
Statistical Summary of the Revised BERA Dataset
Total Soil [a]
Waste Sub-Area
Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas

Chemical	Detection Frequency	Percent Hits	Range of Values, mg/kg: Detected Concentrations Minimum	VQ	Detected Concentrations Maximum	VQ	Reporting Limits Minimum	Reporting Limits Maximum	Mean mg/kg	Statistical Distribution [b]	95% UCL mg/kg [b]	Revised Dataset EPC mg/kg [c]	BERA EPC mg/kg [c]	ESV mg/kg [d]		HQ_{SCREEN} [e]	COPEC? [f,g]
Nitroaromatics																	
1,3,5-Trinitrobenzene	6 / 62	10	0.54		109		0.15	1.5	3.43E+00	Normal	7.24E+00	7.24E+00	**1.71E+01**	0.376		19	Yes
1,3-Dinitrobenzene	3 / 62	4.8	0.42		1.7		0.05	0.255	1.18E-01	Normal	1.45E-01	1.45E-01	**1.24E+00**	0.655		0.2	No (a)
2,4,6-Trinitrotoluene	15 / 101	15	0.206	J	10000		0.1	50	1.01E+02	Lognormal	5.45E+02	**5.45E+02**	2.87E+02	30		18.2	Yes
2,4-Dinitrotoluene [h]	12 / 136	9	0.266		7100		0.0294	759	5.27E+01	Lognormal	2.89E+02	**2.89E+02**	1.01E+02	1.28		226	Yes
2,6-Dinitrotoluene [h]	15 / 136	11	0.107	J	760		0.0294	152	6.25E+00	Lognormal	3.13E+01	**3.13E+01**	1.36E+01	0.0328		954	Yes
2-Amino-4,6-dinitrotoluene	3 / 62	4.8	0.2675		0.64		0.05	0.259	1.02E-01	Normal	9.67E-02	9.67E-02	**3.54E+00**	80		0.001	No (a)
4-Amino-2,6-dinitrotoluene	3 / 62	4.8	0.2675		0.64		0.05	0.259	1.02E-01	Normal	9.56E-02	9.56E-02	**3.04E+00**	80		0.001	No (a)
HMX	7 / 62	11	0.2875		12		0.1	2.19	6.04E-01	Normal	9.92E-01	9.92E-01	**1.36E+00**	27	(1)	0.04	No (a)
RDX	2 / 62	3	0.22		0.8		0.1	0.995	1.38E-01	Nonparametric	1.44E-01	**1.44E-01**	1.33E-01	100		0.001	No (a)

[a] The revised dataset includes the original BERA dataset with the rejected data removed and replaced with data gaps samples data. Total soil is defined as samples 0 to 3 feet below ground surface (bgs). Deeper samples were also considered total soil if at least 50% of their sampling depth interval was less than 3 ft bgs (e.g., 2-4 ft bgs).

[b] U.S. Environmental Protection Agency (EPA), 2013, ProUCL Version 5.0.00, Technical Support Center, Office of Science Policy, Atlanta, Georgia, September, on line at http://www.epa.gov/osp/hstl/tsc/software.htm..

[c] The EPC is the 95% UCL, or the MDC if sample size is five or less. The screening concentration for the revised revised dataset is presented in the first column, and the EPC calculated in the BERA (see Table 6-19 in Shaw, 2007) is in the second column. The higher of the two values is shaded.

[d] The ESV is the same as was used in the BERA (Shaw, 2007), unless otherwise noted. See Table 1.
(1) no ESV was identified in the BERA. Screening value obtained from Los Alamos National Laboratory (LANL), Eco Risk Database, Release 3.1, October 2012.

[e] The HQ_{screen} is calculated by dividing the Revised Dataset EPC by the ESV.

[f] No = Chemical is not chosen as a COPEC; Yes = Chemical is chosen as a COPEC.

[g] Rationale for exclusion of chemical as a COPEC:
(a) = screening concentration is less than the ESV; therefore the HQ_{screen} is less than 1
(b) detection frequency is less than 3 percent, or if 3% < FOD < 5% results of spatial evaluation demonstrate no hot spot.

[h] Analysis of chemical was performed by two different methods. Dataset consists of a comibination of data from the two methods. See text for details.

BERA = baseline ecological risk assessment
COPEC = chemical of potential ecological concern
EPC = exposure point concentration
ESV = ecological screening value
HQ_{screen} = screening-level hazard quotient
MDC = maximum detected concentration
ND = Not detected in BERA dataset. The sole detection of this chemical was in the Post-BERA dataset.
mg/kg = milligrams per kilogram
UCL = upper confidence limit on the mean

Table 8
Sample Summary for the Revised Dataset for Sediment
Harrison Bayou
Longhorn Army Ammunition Plant, Karnack, Texas

Location	Sample Number	Date	Analyses [a]
BERA Samples			
16SD01	16SD01(0-0.5)	05/02/93	SVOC
16SD03	16SD03(0-1)	04/14/93	SVOC
16SD04	16SD04(0-1)	04/14/93	SVOC
16SD05	16SD05(0-0.5)	05/02/93	SVOC
16SD35	16SD35	10/29/97	Explosives
17SD03	17SD03	04/21/93	SVOC
17SD13	17SD13	09/17/98	Explosives
17SD14	17SD14	09/17/98	Explosives, SVOC
18SD01	18SD01(0-0.5)	05/02/93	SVOC
18SD02	18SD02(0-0.5)	05/02/93	SVOC
18SD27	18SD27	10/07/98	Explosives, SVOC
18SD28	18SD28	11/12/98	Explosives, SVOC
27SD02	LH27-SD02	03/30/93	SVOC
27SD03	LH27-SD03	03/30/93	SVOC
27SD04	LH27-SD04	03/30/93	SVOC
FWS-149	CLNWR149	09/09/03	SVOC
FWS-153	CLNWR153	09/09/03	SVOC
FWS-154	CLNWR154	09/09/03	SVOC
FWS-162	CLNWR162	09/09/03	SVOC
FWS-163	CLNWR163	09/09/03	SVOC
FWS-170	CLNWR170	09/09/03	SVOC
FWS-171	CLNWR171	09/09/03	SVOC
HBSD01	P3HBSD01	09/17/98	Explosives, SVOC
XXSD01	LHXX-SD01	03/30/93	SVOC
XXSD15	C940823-XXSD15-N00	08/23/94	SVOC
XXSD15	LHXX-SD15	03/31/93	SVOC
Post-BERA Samples			
IWSD17	IWSD17	09/16/04	Explosives
Data Gaps Samples			
HB-ABERA-01SD	HB-ABERA-01SD	10/24/13	Explosives
HB-ABERA-02SD	HB-ABERA-02SD	10/24/13	Explosives
HB-ABERA-03SD	HB-ABERA-03SD	10/24/13	Explosives
HB-ABERA-04SD	HB-ABERA-04SD	10/24/13	Explosives
HB-ABERA-05SD	HB-ABERA-05SD	10/24/13	Explosives
HB-ABERA-06SD	HB-ABERA-06SD	10/24/13	Explosives
HB-ABERA-07SD	HB-ABERA-07SD	10/24/13	Explosives
HB-ABERA-08SD	HB-ABERA-08SD	10/24/13	Explosives

[a] Only analytical data containing explosives compounds are presented for these samples. Additional analyses may also have been performed on the sample.

Field Duplicates are not presented.

SVOC = Semivolatile organic compounds that include one or more explosives compounds (e.g., 2,4- and 2,6-dinitrotoluene, nitrobenzene, etc.)

Table 9
Sample Summary for the Revised Dataset for Surface Water
Harrison Bayou
Longhorn Army Ammunition Plant, Karnack, Texas

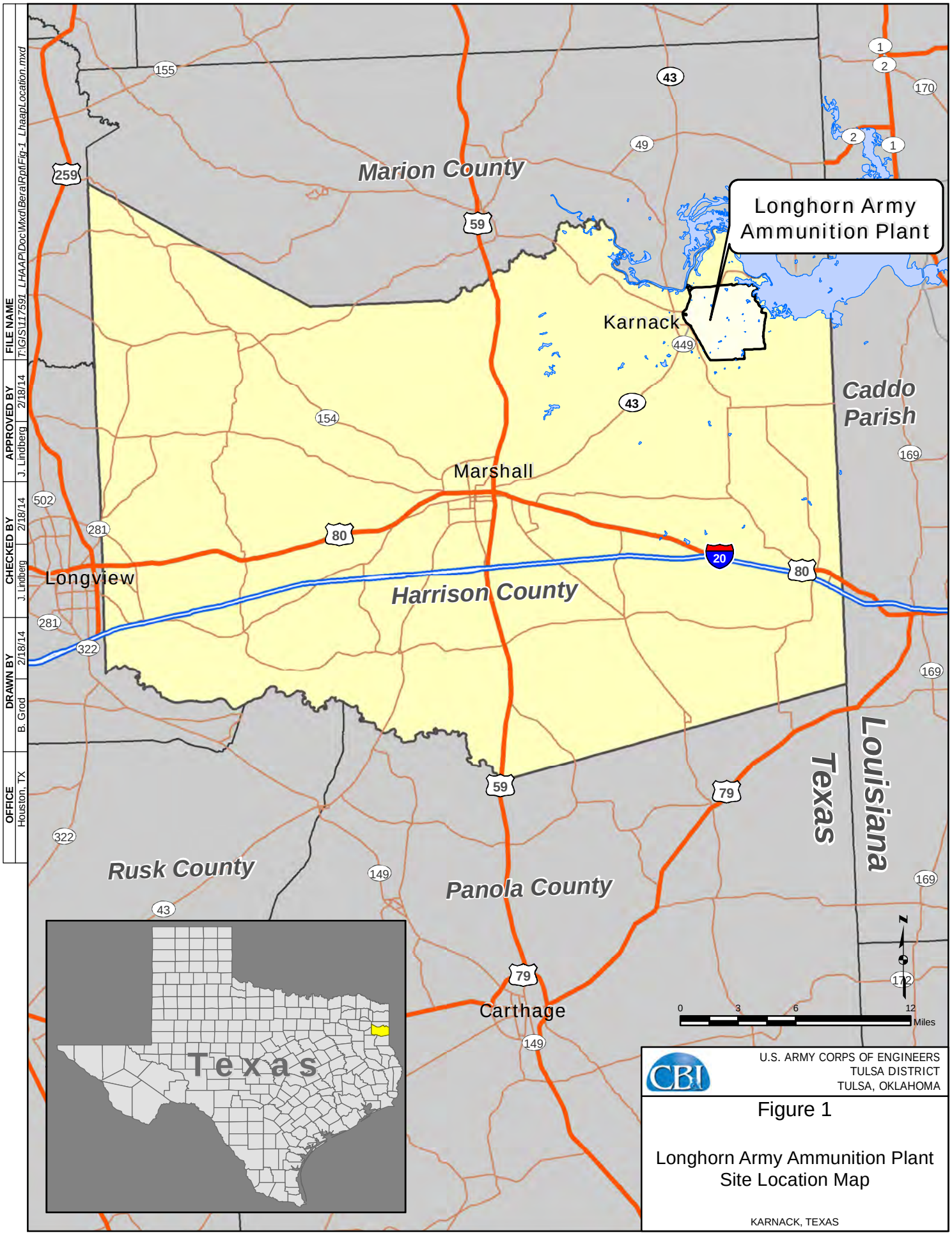
Location	Sample Number	Date	Analyses [a]
BERA Samples			
16SW01	16SW01	5/4/93	SVOC
16SW03	16SW03	4/14/93	SVOC
16SW04	16SW04	4/14/93	SVOC
16SW05	16SW05	5/13/93	SVOC
16SW35	16SW35	10/29/97	Explosives
17SW13	17SW13	9/17/98	Explosives
17SW14	17SW14	9/17/98	Explosives, SVOC
18SW01	18SW01	6/13/93	SVOC
18SW02	18SW02	5/11/93	SVOC
18SW27	18SW27	10/7/98	Explosives, SVOC
18SW28	18SW28	11/12/98	Explosives, SVOC
27SW02	LH27-SW02	3/30/93	SVOC
27SW03	LH27-SW03	3/30/93	SVOC
27SW04	LH27-SW04	3/30/93	SVOC
HBSW01	P3HBSW01	9/17/98	Explosives, SVOC
HBSW01	P3HBSW01-981204	12/4/98	Explosives, SVOC
HBW-1	HBW-1-960807	8/7/96	Explosives
HBW-5	HBW-5-960807	8/7/96	Explosives
HBW-6A	HBW-6A-960807	8/7/96	Explosives
XXSW01	LHXX-SW01	3/30/93	SVOC
XXSW15	LHXX-SW15	3/31/93	SVOC
Post-BERA Samples			
IWSW17	IWSW17-040916	9/16/04	Explosives
Data Gaps Samples			
HB-ABERA-01SW	HB-ABERA-01SW	10/24/13	Explosives
HB-ABERA-03SW	HB-ABERA-03SW	10/24/13	Explosives
HB-ABERA-04SW	HB-ABERA-04SW	10/24/13	Explosives
HB-ABERA-07SW	HB-ABERA-07SW	10/24/13	Explosives

[a] Only analytical data containing explosives compounds are presented for these samples. Additional analyses may also have been performed on the sample.

Field Duplicates are not presented.

SVOC = Semivolatile organic compounds that include one or more explosives compounds (e.g., 2,4- and 2,6-dinitrotoluene, nitrobenzene, etc.)

FIGURES



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TULSA DISTRICT
TULSA, OKLAHOMA

Figure 1

Longhorn Army Ammunition Plant
Site Location Map

KARNACK, TEXAS

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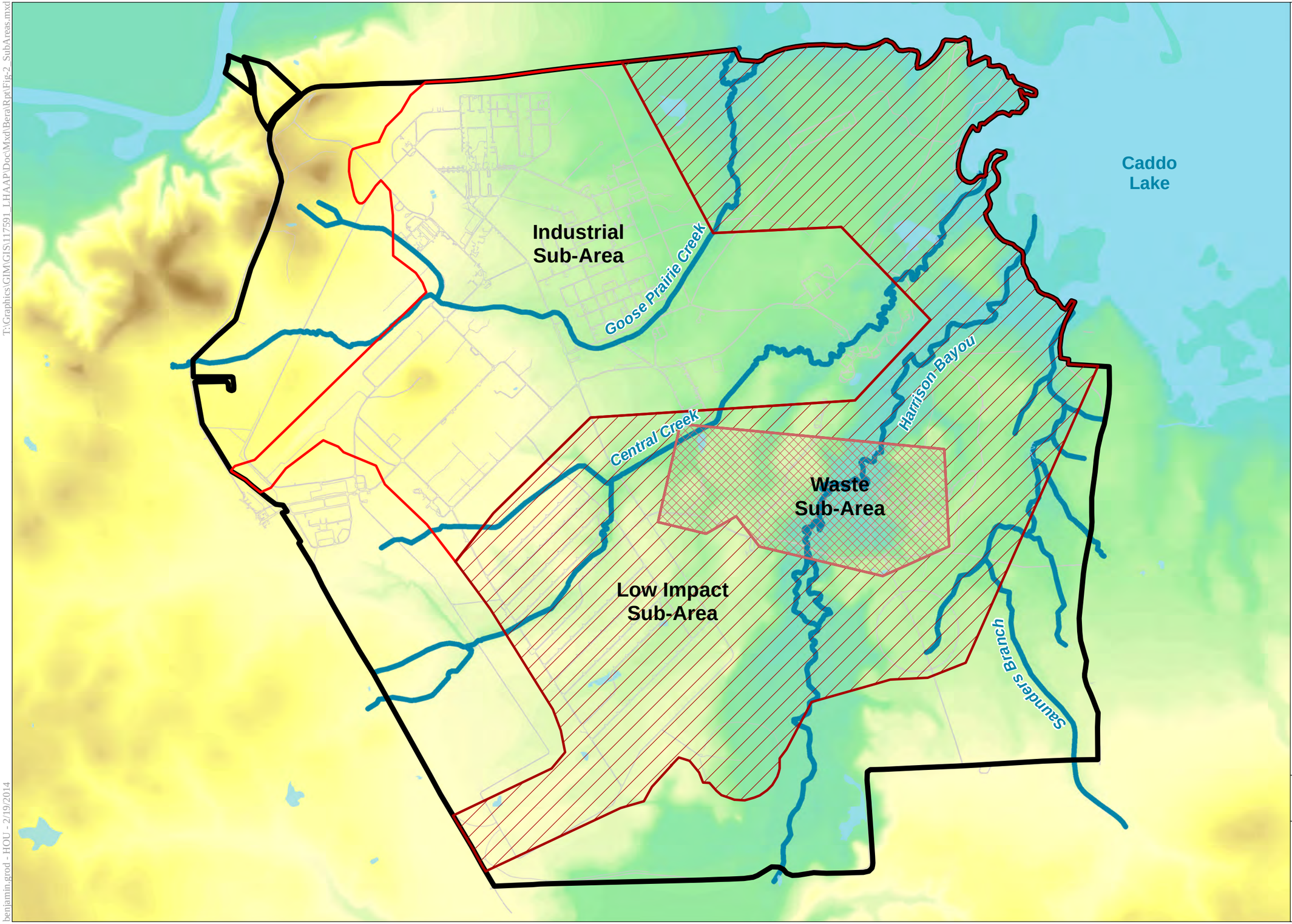

Legend

- Roads
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 2,300
Feet
1 inch = 2,300 feet

Texas State Plane North Central Feet

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Figure 2

LHAAP
Terrestrial Sub-Areas
and Watersheds

KARNACK, TEXAS

benjamin.grod - HOU - 2/19/2014

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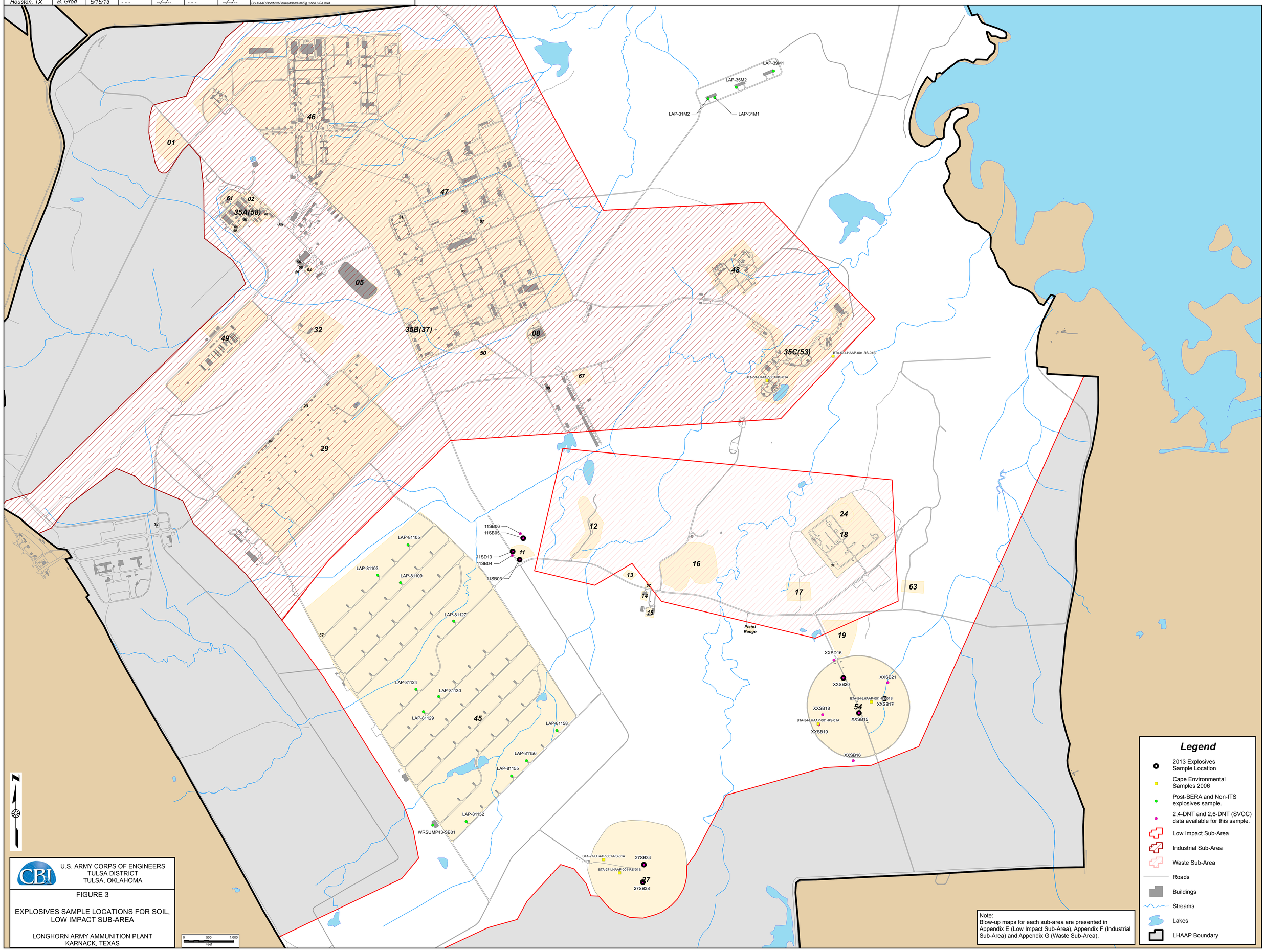

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TULSA, OKLAHOMA

FIGURE 3

EXPLOSIVES SAMPLE LOCATIONS FOR SOIL, LOW IMPACT SUB-AREA

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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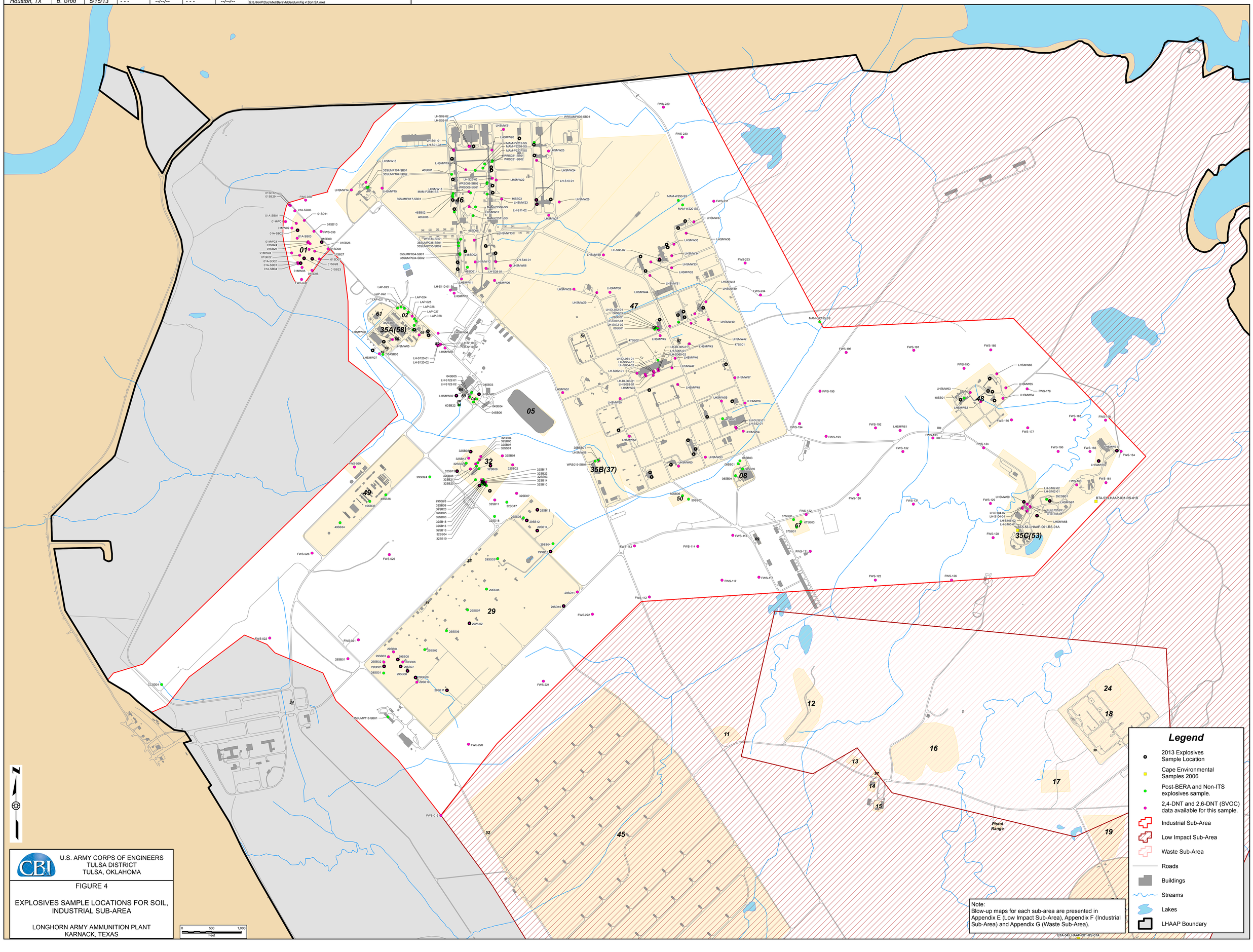
01
02
05
08
12
13
14
15
16
17
18
19
23
24
29
32
34
35A(58)
35B(37)
35C(53)
45
46
47
48
49
50
51
52
57
60
61
67
Pistol Range
BTA-53-LHAAP-001-RS-01A
BTA-53-LHAAP-001-RS-01B
LH-S02-02
LH-S02-01
LH-S01-01
LH-S01-02
LH-S22-02
LH-S22-01
LH-S10-01
LH-S11-02
LH-S86-02
LH-S40-01
LH-S38-01
LH-S110-01
LH-S120-01
LH-S120-02
LH-S122-01
LH-S122-02
LH-DL072-01
LH-S072-01
LH-S072-02
LH-DL065-01
LH-S065-01
LH-S065-02
LH-DL064-01
LH-S064-01
LH-S064-02
LH-S062-01
LH-DL063-01
LH-S063-01
LH-DL52-01
LH-S52-01
LH-S102-02
LH-S102-01
LH-S103-02
LH-S103-01
LH-S104-02
LH-S104-01
LH-S105-02
LH-S105-01
WRSUMP005-SB01
WRS021-SB01
WRS021-SB02
WRS008-SB02
WRS008-SB01
WRS14-SB01
WRS019-SB01
35SUMP107-SB01
35SUMP107-SB02
35SUMP017-SB01
35SUMP035-SB01
35SUMP035-SB02
35SUMP034-SB01
35SUMP034-SB02
35SUMP118-SB01
MAM-P223-SS
MAM-P226B-SS
MAM-P223-DS
MAM-P544-SS
MAM-P256-SS
MAM-P257-SS
MAM-W250-SS
MAM-W220-SS
MAM-DP150-SS
LHSMW01
LHSMW02
LHSMW03
LHSMW04
LHSMW05
LHSMW06
LHSMW07
LHSMW08
LHSMW09
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LHSMW11
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FWS-003
FWS-004
FWS-005
FWS-006
FWS-007
FWS-008
FWS-009
FWS-010
FWS-011
FWS-012
FWS-013
FWS-014
FWS-015
FWS-016
FWS-017
FWS-018
FWS-019
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FWS-040

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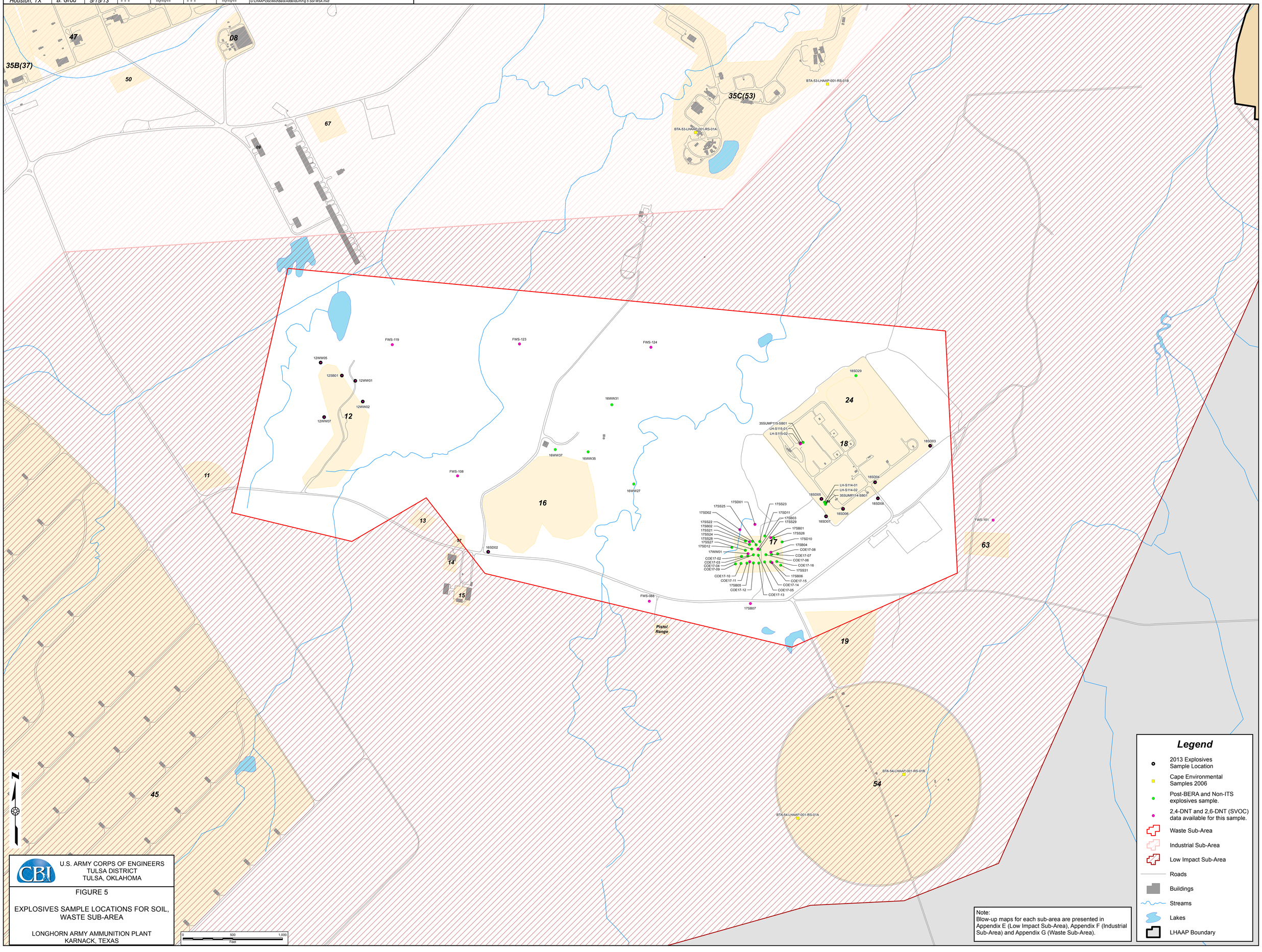

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FIGURE 5

EXPLOSIVES SAMPLE LOCATIONS FOR SOIL, WASTE SUB-AREA

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Legend

- 2013 Explosives Sample Location
- Cape Environmental Samples 2006
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Waste Sub-Area
- Industrial Sub-Area
- Low Impact Sub-Area
- Roads
- Buildings
- Streams
- Lakes
- LHAAP Boundary

Note:
Blow-up maps for each sub-area are presented in Appendix E (Low Impact Sub-Area), Appendix F (Industrial Sub-Area) and Appendix G (Waste Sub-Area).

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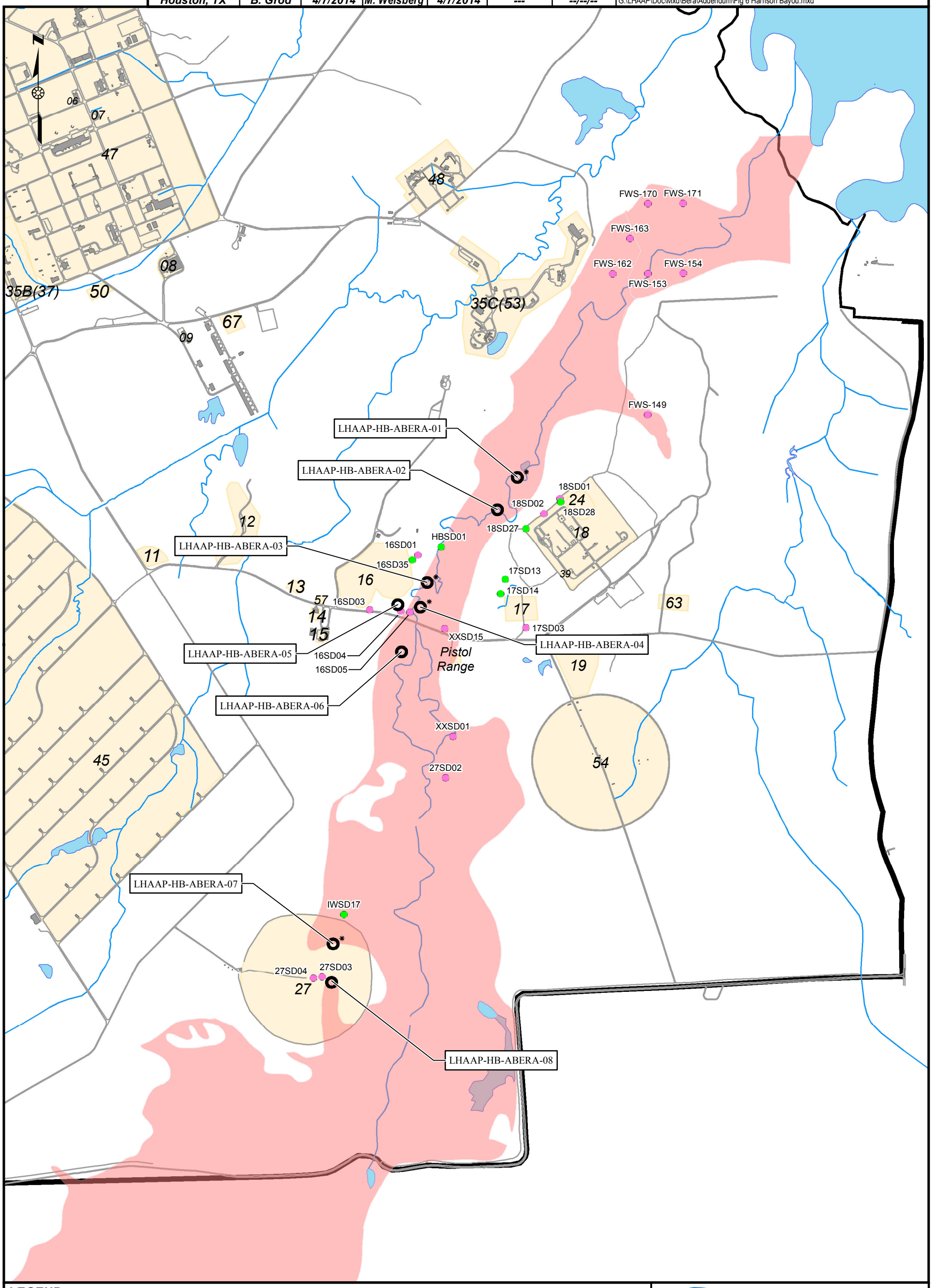

LEGEND

- 2013 Explosives Sediment Sample Location
- 2013 Explosives Surface Water Sample Location
- Post-BERA and Non-ITS explosives Sample
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample
- Watershed
- Roads
- Buildings
- Streams
- Lakes
- LHAAP Boundary

0 650 1,300 2,600 Feet

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FIGURE 6

EXPLOSIVES SAMPLE LOCATIONS FOR SEDIMENT AND SURFACE WATER, HARRISON BAYOU

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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32SB03
32SB04
32SB01
32SB12
32SB05
32SS02
32SS01
32SB07
620-K
32SB02
32SB21
32SB06
32SB08
32SB20
32SB13
620-A
LHAAP 32
32SB17
32SB09
32SB10
32SD05
AVE C
32SD07
32SD07

32SS03

Sample	Depth (ft)	Date	Result (mg/kg)
32SS03(0-0.5)	0-0.5	26-Jul-98	57000
32SS03(1-3)	1-3	26-Jul-98	45
32SS03R-SS(0-.5)	0-0.5	23-Oct-13	ND
32SS03R-SB(.5-3)	0.5-3	23-Oct-13	ND

32SB22

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB22	0-1	8-Sep-04	46

32SB14

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB14	0-1	16-Aug-04	ND
32SB14R-SS(0-.5)	0-0.5	23-Oct-13	ND
32SB14R-SB(.5-3)	0.5-3	23-Oct-13	ND

32SB17

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB17	0-1	17-Aug-04	ND

29SD26

Sample	Depth (ft)	Date	Result (mg/kg)
29SD26	0-0	7-Oct-98	ND

32SB23

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB23	0-1	8-Sep-04	ND

32SB16

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB16	0-1	16-Aug-04	ND

32SB15

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB15	0-1	16-Aug-04	ND

32SS04

Sample	Depth (ft)	Date	Result (mg/kg)
32SS04(0-0.5)	0-0.5	26-Jul-98	3.9
AVG-32SS04(1-3)	1-3	26-Jul-98	ND
32SS04R-SS(0-.5)	0-0.5	25-Oct-13	ND
32SS04R-SB(.5-3)	0.5-3	25-Oct-13	ND

32SD06R

Sample	Depth (ft)	Date	Result (mg/kg)
32SD06R-SS(0-.5)	0-0.5	25-Oct-13	ND
32SD06R-SB(.5-3)	0.5-3	25-Oct-13	ND

32SB18

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB18	0-1	17-Aug-04	ND

32WL01

Sample	Depth (ft)	Date	Result (mg/kg)
32WL01R-SS(0-.5)	0-0.5	25-Oct-13	ND
32WL01R-SB(.5-3)	0.5-3	25-Oct-13	ND

32SB19

Sample	Depth (ft)	Date	Result (mg/kg)
L0001-32SB19	0-1	17-Aug-04	ND

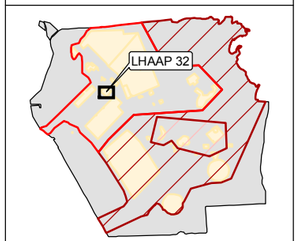
Legend

- Replacement Explosives Sample Location
- ITS explosives data removed. No explosives data available for this sample.
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings

Notes:
1) TNT concentrations are shown in parentheses.
2) Results displayed in milligrams per kilogram (mg/kg)
3) (R) indicates a 2013 replacement sample was collected.
4) Historical results are listed first.
5) ND = Not detected
6) NA = Not applicable (no explosive data)

0 100
Feet
1 inch = 100 feet

Texas State Plane North Central Feet



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TULSA DISTRICT
TULSA, OKLAHOMA

Figure 7

TNT Results
in Soil at LHAAP-32

KARNACK, TEXAS

benjamin.grod - HOU - 4/3/2014

APPENDIX A

Analytical Data in the Revised Datasets for Soil (LISA, ISA, and WSA)

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0795	U	N	CAPE 2006
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.266	U	0.133	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.086	U	N	CAPE 2006
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0742	U	N	CAPE 2006
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0783	U	N	CAPE 2006
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	Y	Post-BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0795	U	N	CAPE 2006
1,3-Dinitrobenzene	99-65-0	mg/kg	0.266	UJ	0.133	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.086	U	N	CAPE 2006
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0742	U	N	CAPE 2006
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	UJ	0.121	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0783	U	N	CAPE 2006
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	Y	Post-BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	Y	Post-BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	UJ	0.123	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0739	U	N	CAPE 2006
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.266	U	0.133	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0799	U	N	CAPE 2006
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0689	U	N	CAPE 2006
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0728	U	N	CAPE 2006
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	Y	Post-BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	Y	Post-BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	11SB03	LH11-SB03 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	11SB04	LH11-SB04 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	11SB05	LH11-SB05 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	11SB06	LH11-SB06 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	11SD13	LH11-SD13	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	11WW01	11WW01 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	11WW02	11WW02 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	11WW03	11WW03 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	27SB34	AVG-LH27-SB34(0-3)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	UJ	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	27SB38	LH27-SB38(0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.148	U	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0517	U	N	CAPE 2006
2,4-Dinitrotoluene	121-14-2	mg/kg	0.16	UJ	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0559	U	N	CAPE 2006
2,4-Dinitrotoluene	121-14-2	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0482	U	N	CAPE 2006
2,4-Dinitrotoluene	121-14-2	mg/kg	0.145	UJ	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0509	U	N	CAPE 2006
2,4-Dinitrotoluene	121-14-2	mg/kg	0.216	U	0.108	FWS-003	C-SS-003	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.199	U	0.0995	FWS-004	C-SS-004	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.217	U	0.1085	FWS-005	C-SS-005	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.295	U	0.1475	FWS-041	C-SS-041	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.291	U	0.1455	FWS-042	C-SS-042	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.383	U	0.1915	FWS-043	C-SS-043	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0351	U	0.01755	FWS-050	CLNWR050	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0362	U	0.0181	FWS-051	CLNWR051	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0416	U	0.0208	FWS-055	CLNWR055	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0314	Unv	0.0157	FWS-056	AVG-CLNWR056	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0274	U	0.0137	FWS-062	CLNWR062	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0388	U	0.0194	FWS-063	CLNWR063	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0347	U	0.01735	FWS-073	CLNWR073	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0302	U	0.0151	FWS-074	CLNWR074	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0339	Unv	0.01695	FWS-075	AVG-CLNWR075	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0476	U	0.0238	FWS-076	CLNWR076	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0349	U	0.01745	FWS-077	CLNWR077	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0342	U	0.0171	FWS-078	CLNWR078	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0335	U	0.01675	FWS-079	CLNWR079	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0333	U	0.01665	FWS-080	CLNWR080	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0343	U	0.01715	FWS-081	CLNWR081	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0367	U	0.01835	FWS-082	CLNWR082	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0353	U	0.01765	FWS-083	CLNWR083	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.033	U	0.0165	FWS-084	CLNWR084	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0336	U	0.0168	FWS-085	CLNWR085	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0317	U	0.01585	FWS-086	CLNWR086	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0301	U	0.01505	FWS-087	CLNWR087	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0348	U	0.0174	FWS-095	CLNWR095	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0316	U	0.0158	FWS-098	CLNWR098	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0299	U	0.01495	FWS-102	CLNWR102	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0332	U	0.0166	FWS-103	CLNWR103	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0349	U	0.01745	FWS-104	CLNWR104	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0295	U	0.01475	FWS-105	CLNWR105	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.033	U	0.0165	FWS-106	CLNWR106	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0285	U	0.01425	FWS-107	CLNWR107	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0331	U	0.01655	FWS-109	CLNWR109	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0365	U	0.01825	FWS-110	CLNWR110	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0278	U	0.0139	FWS-111	CLNWR111	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0306	U	0.0153	FWS-120	CLNWR120	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0291	U	0.01455	FWS-127	CLNWR127	SEMIVOLATILES	REG	3-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0357	U	0.01785	FWS-136	CLNWR136	SEMIVOLATILES	REG	3-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.04005	Unv	0.020025	FWS-140	AVG-CLNWR140	SEMIVOLATILES	REG	4-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0322	U	0.0161	FWS-141	CLNWR141	SEMIVOLATILES	REG	4-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0329	U	0.01645	FWS-142	CLNWR142	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0334	U	0.0167	FWS-143	CLNWR143	SEMIVOLATILES	REG	22-Aug-94	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0289	U	0.01445	FWS-144	CLNWR144	SEMIVOLATILES	REG	20-Aug-94	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0309	U	0.01545	FWS-145	CLNWR145	SEMIVOLATILES	REG	21-Aug-94	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0298	U	0.0149	FWS-146	CLNWR146	SEMIVOLATILES	AVG	19-Mar-93	0	3	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0294	U	0.0147	FWS-147	CLNWR147	SEMIVOLATILES	REG	20-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.028	U	0.014	FWS-148	CLNWR148	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0364	U	0.0182	FWS-150	CLNWR150	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0408	U	0.0204	FWS-151	CLNWR151	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0373	Unv	0.01865	FWS-152	AVG-CLNWR152	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0338	U	0.0169	FWS-155	CLNWR155	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0321	U	0.01605	FWS-156	CLNWR156	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0326	U	0.0163	FWS-158	CLNWR158	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0358	U	0.0179	FWS-159	CLNWR159	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0307	U	0.01535	FWS-169	CLNWR169	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0312	U	0.0156	FWS-172	CLNWR172	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0349	U	0.01745	FWS-173	CLNWR173	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0341	U	0.01705	FWS-174	CLNWR174	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.033	U	0.0165	FWS-175	CLNWR175	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0303	U	0.01515	FWS-179	CLNWR179	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0343	U	0.01715	FWS-181	CLNWR181	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0344	U	0.0172	FWS-183	CLNWR183	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0311	U	0.01555	FWS-184	CLNWR184	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0386	U	0.0193	FWS-185	CLNWR185	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03485	Unv	0.017425	FWS-186	AVG-CLNWR186	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0333	U	0.01665	FWS-187	CLNWR187	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0332	U	0.0166	FWS-188	CLNWR188	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0326	U	0.0163	FWS-197	CLNWR197	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0319	U	0.01595	FWS-198	CLNWR198	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0302	U	0.0151	FWS-199	CLNWR199	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0353	Unv	0.01765	FWS-200	AVG-CLNWR200	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03865	Unv	0.019325	FWS-201	AVG-CLNWR201	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0326	U	0.0163	FWS-202	CLNWR202	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0304	U	0.0152	FWS-203	CLNWR203	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0299	U	0.01495	FWS-204	CLNWR204	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0302	U	0.0151	FWS-205	CLNWR205	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0398	U	0.0199	FWS-206	CLNWR206	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0303	U	0.01515	FWS-207	CLNWR207	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0369	U	0.01845	FWS-208	CLNWR208	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03145	Unv	0.015725	FWS-209	AVG-CLNWR209	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0298	U	0.0149	FWS-210	CLNWR210	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0333	U	0.01665	FWS-211	CLNWR211	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0299	U	0.01495	FWS-212	CLNWR212	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0298	U	0.0149	FWS-213	CLNWR213	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03215	Unv	0.016075	FWS-214	AVG-CLNWR214	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0295	U	0.01475	FWS-216	CLNWR216	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0398	U	0.0199	FWS-217	CLNWR217	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0309	U	0.01545	FWS-218	CLNWR218	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0287	U	0.01435	FWS-219	CLNWR219	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0374	U	0.0187	FWS-223	CLNWR223	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0351	U	0.01755	FWS-226	CLNWR226	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0365	U	0.01825	FWS-228	CLNWR228	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0339	U	0.01695	FWS-232	CLNWR232	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0332	U	0.0166	FWS-235	CLNWR235	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0342	U	0.0171	FWS-236	CLNWR236	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0326	U	0.0163	FWS-237	CLNWR237	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0346	Unv	0.0173	FWS-238	AVG-CLNWR238	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0344	U	0.0172	FWS-239	CLNWR239	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0359	U	0.01795	FWS-240	CLNWR240	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0352	U	0.0176	FWS-241	CLNWR241	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0344	U	0.0172	FWS-242	CLNWR242	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0311	U	0.01555	FWS-243	CLNWR243	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0373	U	0.01865	FWS-244	CLNWR244	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0337	U	0.01685	FWS-245	CLNWR245	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LAP-31M1	LAP-31M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LAP-31M2	LAP-31M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	1.8	U	0.9	LAP-35M2	LAP-35M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LAP-39M1	LAP-39M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.4	U	0.2	LAP-81105	LAP-81105	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	3.6	U	1.8	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	1.8	U	0.9	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LAP-81146	LAP-81146	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LAP-81147	LAP-81147	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LAP-81152	LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LAP-81158	LAP-81158	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	N	Post-BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSB15	LHXX-SB15(0-2)	SEMIVOLATILES	REG	9-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSB16	LHXX-SB16(0-3)	SEMIVOLATILES	REG	9-Mar-93	0	3	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSB17	LHXX-SB17(0-2)	SEMIVOLATILES	REG	9-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSB18	LHXX-SB18 (0-2)	SEMIVOLATILES	REG	10-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSB19	LHXX-SB19(0-2.5	SEMIVOLATILES	REG	9-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.48	U	0.24	XXSB20	C940823-XXSB20-N00	SEMIVOLATILES	REG	23-Aug-94	0	0		<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSB20	LHXX-SB20(0-2.5	SEMIVOLATILES	REG	10-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSB21	AVG-LHXX-SB21(0-2.5	SEMIVOLATILES	AVG	10-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	XXSD16	LHXX-SD16	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	11SB03	LH11-SB03 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	11SB04	LH11-SB04 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	11SB05	LH11-SB05 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	11SB06	LH11-SB06 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	11SD13	LH11-SD13	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	11WW01	11WW01 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	11WW02	11WW02 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	11WW03	11WW03 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	27SB34	AVG-LH27-SB34(0-3)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	27SB38	LH27-SB38(0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.148	UJ	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0689	U	N	CAPE 2006
2,6-Dinitrotoluene	606-20-2	mg/kg	0.16	UJ	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0745	U	N	CAPE 2006
2,6-Dinitrotoluene	606-20-2	mg/kg	0.138	UJ	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0642	U	N	CAPE 2006
2,6-Dinitrotoluene	606-20-2	mg/kg	0.145	UJ	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0678	U	N	CAPE 2006
2,6-Dinitrotoluene	606-20-2	mg/kg	0.216	U	0.108	FWS-003	C-SS-003	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.199	U	0.0995	FWS-004	C-SS-004	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.217	U	0.1085	FWS-005	C-SS-005	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.295	U	0.1475	FWS-041	C-SS-041	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.291	U	0.1455	FWS-042	C-SS-042	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.383	U	0.1915	FWS-043	C-SS-043	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0351	U	0.01755	FWS-050	CLNWR050	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0362	U	0.0181	FWS-051	CLNWR051	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0416	U	0.0208	FWS-055	CLNWR055	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0314	Unv	0.0157	FWS-056	AVG-CLNWR056	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0274	U	0.0137	FWS-062	CLNWR062	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0388	U	0.0194	FWS-063	CLNWR063	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0347	U	0.01735	FWS-073	CLNWR073	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0302	U	0.0151	FWS-074	CLNWR074	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0339	Unv	0.01695	FWS-075	AVG-CLNWR075	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0476	U	0.0238	FWS-076	CLNWR076	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0349	U	0.01745	FWS-077	CLNWR077	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0342	U	0.0171	FWS-078	CLNWR078	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0335	U	0.01675	FWS-079	CLNWR079	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0333	U	0.01665	FWS-080	CLNWR080	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0343	U	0.01715	FWS-081	CLNWR081	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0367	U	0.01835	FWS-082	CLNWR082	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0353	U	0.01765	FWS-083	CLNWR083	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.033	U	0.0165	FWS-084	CLNWR084	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0336	U	0.0168	FWS-085	CLNWR085	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0317	U	0.01585	FWS-086	CLNWR086	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0301	U	0.01505	FWS-087	CLNWR087	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0348	U	0.0174	FWS-095	CLNWR095	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0316	U	0.0158	FWS-098	CLNWR098	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0299	U	0.01495	FWS-102	CLNWR102	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0332	U	0.0166	FWS-103	CLNWR103	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0349	U	0.01745	FWS-104	CLNWR104	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0295	U	0.01475	FWS-105	CLNWR105	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.033	U	0.0165	FWS-106	CLNWR106	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0285	U	0.01425	FWS-107	CLNWR107	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0331	U	0.01655	FWS-109	CLNWR109	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0365	U	0.01825	FWS-110	CLNWR110	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0278	U	0.0139	FWS-111	CLNWR111	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0306	U	0.0153	FWS-120	CLNWR120	SEMIVOLATILES	REG	3-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0291	U	0.01455	FWS-127	CLNWR127	SEMIVOLATILES	REG	3-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0357	U	0.01785	FWS-136	CLNWR136	SEMIVOLATILES	REG	4-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.04005	Unv	0.020025	FWS-140	AVG-CLNWR140	SEMIVOLATILES	REG	4-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0322	U	0.0161	FWS-141	CLNWR141	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0329	U	0.01645	FWS-142	CLNWR142	SEMIVOLATILES	REG	22-Aug-94	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0334	U	0.0167	FWS-143	CLNWR143	SEMIVOLATILES	REG	20-Aug-94	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0289	U	0.01445	FWS-144	CLNWR144	SEMIVOLATILES	REG	21-Aug-94	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0309	U	0.01545	FWS-145	CLNWR145	SEMIVOLATILES	AVG	19-Mar-93	0	3	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0298	U	0.0149	FWS-146	CLNWR146	SEMIVOLATILES	REG	20-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0294	U	0.0147	FWS-147	CLNWR147	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.028	U	0.014	FWS-148	CLNWR148	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0364	U	0.0182	FWS-150	CLNWR150	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0408	U	0.0204	FWS-151	CLNWR151	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0373	Unv	0.01865	FWS-152	AVG-CLNWR152	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0338	U	0.0169	FWS-155	CLNWR155	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0321	U	0.01605	FWS-156	CLNWR156	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0326	U	0.0163	FWS-158	CLNWR158	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0358	U	0.0179	FWS-159	CLNWR159	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0307	U	0.01535	FWS-169	CLNWR169	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0312	U	0.0156	FWS-172	CLNWR172	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0349	U	0.01745	FWS-173	CLNWR173	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0341	U	0.01705	FWS-174	CLNWR174	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.033	U	0.0165	FWS-175	CLNWR175	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0303	U	0.01515	FWS-179	CLNWR179	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0343	U	0.01715	FWS-181	CLNWR181	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0344	U	0.0172	FWS-183	CLNWR183	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0311	U	0.01555	FWS-184	CLNWR184	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0386	U	0.0193	FWS-185	CLNWR185	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03485	Unv	0.017425	FWS-186	AVG-CLNWR186	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0333	U	0.01665	FWS-187	CLNWR187	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0332	U	0.0166	FWS-188	CLNWR188	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0326	U	0.0163	FWS-197	CLNWR197	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0319	U	0.01595	FWS-198	CLNWR198	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0302	U	0.0151	FWS-199	CLNWR199	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0353	Unv	0.01765	FWS-200	AVG-CLNWR200	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03865	Unv	0.019325	FWS-201	AVG-CLNWR201	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0326	U	0.0163	FWS-202	CLNWR202	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0304	U	0.0152	FWS-203	CLNWR203	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0299	U	0.01495	FWS-204	CLNWR204	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0302	U	0.0151	FWS-205	CLNWR205	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0398	U	0.0199	FWS-206	CLNWR206	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0303	U	0.01515	FWS-207	CLNWR207	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0369	U	0.01845	FWS-208	CLNWR208	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03145	Unv	0.015725	FWS-209	AVG-CLNWR209	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0298	U	0.0149	FWS-210	CLNWR210	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0333	U	0.01665	FWS-211	CLNWR211	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0299	U	0.01495	FWS-212	CLNWR212	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0298	U	0.0149	FWS-213	CLNWR213	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03215	Unv	0.016075	FWS-214	AVG-CLNWR214	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0295	U	0.01475	FWS-216	CLNWR216	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0398	U	0.0199	FWS-217	CLNWR217	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0309	U	0.01545	FWS-218	CLNWR218	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0287	U	0.01435	FWS-219	CLNWR219	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0374	U	0.0187	FWS-223	CLNWR223	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0351	U	0.01755	FWS-226	CLNWR226	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0365	U	0.01825	FWS-228	CLNWR228	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0339	U	0.01695	FWS-232	CLNWR232	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0332	U	0.0166	FWS-235	CLNWR235	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0342	U	0.0171	FWS-236	CLNWR236	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0326	U	0.0163	FWS-237	CLNWR237	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0346	Unv	0.0173	FWS-238	AVG-CLNWR238	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0344	U	0.0172	FWS-239	CLNWR239	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0359	U	0.01795	FWS-240	CLNWR240	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0352	U	0.0176	FWS-241	CLNWR241	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0344	U	0.0172	FWS-242	CLNWR242	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0311	U	0.01555	FWS-243	CLNWR243	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0373	U	0.01865	FWS-244	CLNWR244	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0337	U	0.01685	FWS-245	CLNWR245	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LAP-31M1	LAP-31M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LAP-31M2	LAP-31M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	1.8	U	0.9	LAP-35M2	LAP-35M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LAP-39M1	LAP-39M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.4	U	0.2	LAP-81105	LAP-81105	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	3.6	U	1.8	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	1.8	U	0.9	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LAP-81146	LAP-81146	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LAP-81147	LAP-81147	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LAP-81152	LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LAP-81158	LAP-81158	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.254	U	0.127	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	Y	Post-BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	N	Post-BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSB15	LHXX-SB15(0-2)	SEMIVOLATILES	REG	9-Mar-93	0	2	-0.099	<	N	BERA SVOC

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSB16	LHXX-SB16(0-3)	SEMIVOLATILES	REG	9-Mar-93	0	3	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSB17	LHXX-SB17(0-2)	SEMIVOLATILES	REG	9-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSB18	LHXX-SB18 (0-2)	SEMIVOLATILES	REG	10-Mar-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSB19	LHXX-SB19(0-2.5	SEMIVOLATILES	REG	9-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.48	U	0.24	XXSB20	C940823-XXSB20-N00	SEMIVOLATILES	REG	23-Aug-94	0	0		<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSB20	LHXX-SB20(0-2.5	SEMIVOLATILES	REG	10-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSB21	AVG-LHXX-SB21(0-2.5	SEMIVOLATILES	AVG	10-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	XXSD16	LHXX-SD16	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	UJ	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.148	U	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0786	U	N	CAPE 2006
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.16	U	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.085	U	N	CAPE 2006
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0733	U	N	CAPE 2006
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.145	U	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0774	U	N	CAPE 2006
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	Y	Post-BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	UJ	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.148	UJ	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0688	U	N	CAPE 2006
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.16	UJ	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0744	U	N	CAPE 2006
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.138	UJ	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0642	U	N	CAPE 2006
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.145	UJ	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0677	U	N	CAPE 2006
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	Y	Post-BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
HMX	2691-41-0	mg/kg	0.148	UJ	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0709	U	N	CAPE 2006
HMX	2691-41-0	mg/kg	0.16	U	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0767	U	N	CAPE 2006
HMX	2691-41-0	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0662	U	N	CAPE 2006
HMX	2691-41-0	mg/kg	0.145	U	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0699	U	N	CAPE 2006
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-31M1	LAP-31M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.19	U	0.095	LAP-31M2	LAP-31M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.19	U	0.095	LAP-35M2	LAP-35M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-39M1	LAP-39M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-81158	LAP-81158	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
HMX	2691-41-0	mg/kg	2.15	U	1.075	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
HMX	2691-41-0	mg/kg	2.19	U	1.095	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	Y	Post-BERA
HMX	2691-41-0	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
m-Nitrotoluene	99-08-1	mg/kg	0.148	U	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.063	U	N	CAPE 2006
m-Nitrotoluene	99-08-1	mg/kg	0.16	U	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0681	U	N	CAPE 2006
m-Nitrotoluene	99-08-1	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0587	U	N	CAPE 2006
m-Nitrotoluene	99-08-1	mg/kg	0.145	U	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.062	U	N	CAPE 2006
m-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
m-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	Y	Post-BERA
m-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	11SB03	LH11-SB03 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	11SB04	LH11-SB04 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	11SB05	LH11-SB05 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	11SB06	LH11-SB06 (0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	11SD13	LH11-SD13	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	11WW01	11WW01 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	11WW02	11WW02 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	11WW03	11WW03 (0-2')	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	27SB34	AVG-LH27-SB34(0-3)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	27SB38	LH27-SB38(0-2)	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.148	U	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0583	U	N	CAPE 2006
Nitrobenzene	98-95-3	mg/kg	0.16	U	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0631	U	N	CAPE 2006
Nitrobenzene	98-95-3	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0544	U	N	CAPE 2006
Nitrobenzene	98-95-3	mg/kg	0.145	U	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0575	U	N	CAPE 2006
Nitrobenzene	98-95-3	mg/kg	0.216	U	0.108	FWS-003	C-SS-003	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.199	U	0.0995	FWS-004	C-SS-004	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.217	U	0.1085	FWS-005	C-SS-005	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.295	U	0.1475	FWS-041	C-SS-041	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.291	U	0.1455	FWS-042	C-SS-042	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.383	U	0.1915	FWS-043	C-SS-043	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0351	U	0.01755	FWS-050	CLNWR050	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0362	U	0.0181	FWS-051	CLNWR051	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0416	U	0.0208	FWS-055	CLNWR055	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0314	Unv	0.0157	FWS-056	AVG-CLNWR056	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0274	U	0.0137	FWS-062	CLNWR062	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0388	U	0.0194	FWS-063	CLNWR063	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0347	U	0.01735	FWS-073	CLNWR073	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.0302	U	0.0151	FWS-074	CLNWR074	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0339	Unv	0.01695	FWS-075	AVG-CLNWR075	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0476	U	0.0238	FWS-076	CLNWR076	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0349	U	0.01745	FWS-077	CLNWR077	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0342	U	0.0171	FWS-078	CLNWR078	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0335	U	0.01675	FWS-079	CLNWR079	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0333	U	0.01665	FWS-080	CLNWR080	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0343	U	0.01715	FWS-081	CLNWR081	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0367	U	0.01835	FWS-082	CLNWR082	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0353	U	0.01765	FWS-083	CLNWR083	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.033	U	0.0165	FWS-084	CLNWR084	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0336	U	0.0168	FWS-085	CLNWR085	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0317	U	0.01585	FWS-086	CLNWR086	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0301	U	0.01505	FWS-087	CLNWR087	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0348	U	0.0174	FWS-095	CLNWR095	EXPLOSIVES	AVG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0316	U	0.0158	FWS-098	CLNWR098	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0299	U	0.01495	FWS-102	CLNWR102	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0332	U	0.0166	FWS-103	CLNWR103	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0349	U	0.01745	FWS-104	CLNWR104	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0295	U	0.01475	FWS-105	CLNWR105	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.033	U	0.0165	FWS-106	CLNWR106	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0285	U	0.01425	FWS-107	CLNWR107	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0331	U	0.01655	FWS-109	CLNWR109	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0365	U	0.01825	FWS-110	CLNWR110	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0278	U	0.0139	FWS-111	CLNWR111	EXPLOSIVES	REG	10-Jul-00	0	0.5		U	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0306	U	0.0153	FWS-120	CLNWR120	SEMIVOLATILES	REG	3-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0291	U	0.01455	FWS-127	CLNWR127	SEMIVOLATILES	REG	3-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0357	U	0.01785	FWS-136	CLNWR136	SEMIVOLATILES	REG	4-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.04005	Unv	0.020025	FWS-140	AVG-CLNWR140	SEMIVOLATILES	REG	4-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0322	U	0.0161	FWS-141	CLNWR141	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0329	U	0.01645	FWS-142	CLNWR142	SEMIVOLATILES	REG	22-Aug-94	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0334	U	0.0167	FWS-143	CLNWR143	SEMIVOLATILES	REG	20-Aug-94	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0289	U	0.01445	FWS-144	CLNWR144	SEMIVOLATILES	REG	21-Aug-94	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0309	U	0.01545	FWS-145	CLNWR145	SEMIVOLATILES	AVG	19-Mar-93	0	3	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0298	U	0.0149	FWS-146	CLNWR146	SEMIVOLATILES	REG	20-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0294	U	0.0147	FWS-147	CLNWR147	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.028	U	0.014	FWS-148	CLNWR148	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0364	U	0.0182	FWS-150	CLNWR150	SEMIVOLATILES	REG	27-Aug-02	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0408	U	0.0204	FWS-151	CLNWR151	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0373	Unv	0.01865	FWS-152	AVG-CLNWR152	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0338	U	0.0169	FWS-155	CLNWR155	SEMIVOLATILES	REG	25-Sep-02	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0321	U	0.01605	FWS-156	CLNWR156	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0326	U	0.0163	FWS-158	CLNWR158	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0358	U	0.0179	FWS-159	CLNWR159	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0307	U	0.01535	FWS-169	CLNWR169	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0312	U	0.0156	FWS-172	CLNWR172	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0349	U	0.01745	FWS-173	CLNWR173	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0341	U	0.01705	FWS-174	CLNWR174	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.033	U	0.0165	FWS-175	CLNWR175	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0303	U	0.01515	FWS-179	CLNWR179	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0343	U	0.01715	FWS-181	CLNWR181	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0344	U	0.0172	FWS-183	CLNWR183	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0311	U	0.01555	FWS-184	CLNWR184	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0386	U	0.0193	FWS-185	CLNWR185	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03485	Unv	0.017425	FWS-186	AVG-CLNWR186	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0333	U	0.01665	FWS-187	CLNWR187	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0332	U	0.0166	FWS-188	CLNWR188	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0326	U	0.0163	FWS-197	CLNWR197	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0319	U	0.01595	FWS-198	CLNWR198	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0302	U	0.0151	FWS-199	CLNWR199	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0353	Unv	0.01765	FWS-200	AVG-CLNWR200	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03865	Unv	0.019325	FWS-201	AVG-CLNWR201	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0326	U	0.0163	FWS-202	CLNWR202	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0304	U	0.0152	FWS-203	CLNWR203	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0299	U	0.01495	FWS-204	CLNWR204	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0302	U	0.0151	FWS-205	CLNWR205	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0398	U	0.0199	FWS-206	CLNWR206	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0303	U	0.01515	FWS-207	CLNWR207	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0369	U	0.01845	FWS-208	CLNWR208	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03145	Unv	0.015725	FWS-209	AVG-CLNWR209	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0298	U	0.0149	FWS-210	CLNWR210	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0333	U	0.01665	FWS-211	CLNWR211	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.0299	U	0.01495	FWS-212	CLNWR212	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0298	U	0.0149	FWS-213	CLNWR213	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03215	Unv	0.016075	FWS-214	AVG-CLNWR214	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0295	U	0.01475	FWS-216	CLNWR216	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0398	U	0.0199	FWS-217	CLNWR217	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0309	U	0.01545	FWS-218	CLNWR218	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0287	U	0.01435	FWS-219	CLNWR219	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0374	U	0.0187	FWS-223	CLNWR223	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0351	U	0.01755	FWS-226	CLNWR226	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0365	U	0.01825	FWS-228	CLNWR228	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0339	U	0.01695	FWS-232	CLNWR232	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0332	U	0.0166	FWS-235	CLNWR235	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0342	U	0.0171	FWS-236	CLNWR236	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0326	U	0.0163	FWS-237	CLNWR237	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0346	Unv	0.0173	FWS-238	AVG-CLNWR238	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0344	U	0.0172	FWS-239	CLNWR239	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0359	U	0.01795	FWS-240	CLNWR240	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0352	U	0.0176	FWS-241	CLNWR241	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0344	U	0.0172	FWS-242	CLNWR242	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0311	U	0.01555	FWS-243	CLNWR243	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0373	U	0.01865	FWS-244	CLNWR244	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0337	U	0.01685	FWS-245	CLNWR245	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LAP-31M1	LAP-31M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LAP-31M2	LAP-31M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	1.8	U	0.9	LAP-35M2	LAP-35M2	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LAP-39M1	LAP-39M1	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.4	U	0.2	LAP-81105	LAP-81105	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	3.6	U	1.8	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	1.8	U	0.9	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LAP-81146	LAP-81146	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LAP-81147	LAP-81147	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LAP-81152	LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LAP-81158	LAP-81158	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.254	U	0.127	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.127	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.129	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSB15	LHXX-SB15(0-2)	SEMIVOLATILES	REG	9-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSB16	LHXX-SB16(0-3)	SEMIVOLATILES	REG	9-Mar-93	0	3	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSB17	LHXX-SB17(0-2)	SEMIVOLATILES	REG	9-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSB18	LHXX-SB18 (0-2)	SEMIVOLATILES	REG	10-Mar-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSB19	LHXX-SB19(0-2.5	SEMIVOLATILES	REG	9-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.48	U	0.24	XXSB20	C940823-XXSB20-N00	SEMIVOLATILES	REG	23-Aug-94	0	0		<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSB20	LHXX-SB20(0-2.5	SEMIVOLATILES	REG	10-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSB21	AVG-LHXX-SB21(0-2.5	SEMIVOLATILES	AVG	10-Mar-93	0	2.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	XXSD16	LHXX-SD16	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	<	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.246	UJ	0.123	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0781	U	N	CAPE 2006
o-Nitrotoluene	88-72-2	mg/kg	0.266	U	0.133	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0845	U	N	CAPE 2006
o-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0729	U	N	CAPE 2006
o-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0769	U	N	CAPE 2006
o-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
o-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
o-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
o-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	N	Post-BERA
p-Nitrotoluene	99-99-0	mg/kg	0.148	UJ	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0597	U	N	CAPE 2006
p-Nitrotoluene	99-99-0	mg/kg	0.16	UJ	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0646	U	N	CAPE 2006
p-Nitrotoluene	99-99-0	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0557	U	N	CAPE 2006
p-Nitrotoluene	99-99-0	mg/kg	0.145	UJ	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0588	U	N	CAPE 2006
p-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
p-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
p-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	N	Post-BERA
RDX	121-82-4	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
RDX	121-82-4	mg/kg	0.148	U	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0844	U	N	CAPE 2006
RDX	121-82-4	mg/kg	0.16	U	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0913	U	N	CAPE 2006
RDX	121-82-4	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0787	U	N	CAPE 2006
RDX	121-82-4	mg/kg	0.145	U	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0831	U	N	CAPE 2006
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
RDX	121-82-4	mg/kg	0.976	U	0.488	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.0976	U	N	Post-BERA
RDX	121-82-4	mg/kg	0.995	U	0.4975	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.0995	U	N	Post-BERA
RDX	121-82-4	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0968	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.242	U	0.121	11SB03R	11SB03R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0966	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	11SB05R	11SB05R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0962	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.251	U	0.1255	11SB05R	11SB05R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.248	U	0.124	11SD13R	11SD13R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.099	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.242	U	0.121	11SD13R	11SD13R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0968	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.234	U	0.117	27SB34R	27SB34R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0936	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.231	U	0.1155	27SB34R	27SB34R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0924	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.25	U	0.125	27SB38R	27SB38R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.1	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.248	UU	0.124	27SB38R	27SB38R-SS(0-.5)27SB38R-SS(0-.5)FD	EXPLOSIVES	AVG	29-Oct-13	0	0.5	0.09925	UU	NN	Data Gaps
Tetryl	479-45-8	mg/kg	0.148	U	0.074	BTA-27-LHAAP-001-RS-01A	BTA-27-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0721	U	N	CAPE 2006
Tetryl	479-45-8	mg/kg	0.16	UJ	0.08	BTA-27-LHAAP-001-RS-01B	BTA-27-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.078	U	N	CAPE 2006
Tetryl	479-45-8	mg/kg	0.138	U	0.069	BTA-54-LHAAP-001-RS-01A	BTA-54-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0673	U	N	CAPE 2006
Tetryl	479-45-8	mg/kg	0.145	UJ	0.0725	BTA-54-LHAAP-001-RS-01B	BTA-54-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.071	U	N	CAPE 2006

Table A-1
Analytical Data in the Revised Dataset for Soil in the Low Impact Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-81103	LAP-81103	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.22	U	0.11	LAP-81105	LAP-81105	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		<	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-81109	LAP-81109	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-81124	LAP-81124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.19	U	0.095	LAP-81127	LAP-81127	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-81129	LAP-81129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-81130	LAP-81130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		<	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-81152	AVG-LAP-81152	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-81155	LAP-81155	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-81156	LAP-81156	SEMIVOLATILES	REG	10-Jul-00	0	0.5		U	N	BERA SVOC
Tetryl	479-45-8	mg/kg	0.634	U	0.317	WRSUMP13-SB01	WRSUMP13-SB01-01	EXPLOSIVES	REG	15-Nov-06	0	0.5	0.195	U	N	Post-BERA
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	WRSUMP13-SB01	WRSUMP13-SB01-02	EXPLOSIVES	REG	15-Nov-06	1	2	0.199	U	Y	Post-BERA
Tetryl	479-45-8	mg/kg	0.239	U	0.1195	XXSB15R	XXSB15R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0958	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	XXSB15R	XXSB15R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0964	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	XXSB17R	XXSB17R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0914	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.24	U	0.12	XXSB17R	XXSB17R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0959	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.245	U	0.1225	XXSB20R	XXSB20R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0978	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.25	U	0.125	XXSB20R	XXSB20R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.1	U	N	Data Gaps

[a] 2013 Data Gaps samples were analyzed using Method SW-846 8330a; CAPE 2006 samples were analyze using SW-846 8330; BERA and Post-BERA samples were analyzed using the method presented in the 2007 BERA and/or the environmental investigation report of their origin.

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.18	U	0.09	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.75	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.81	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.85	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.195	U	0.0975	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.81	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.86	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.88	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.87	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.18	U	0.09	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.74	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.17	U	0.085	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.492	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.77	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.18	U	0.09	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.69	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.88	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.549	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.86	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.185	U	0.0925	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	1.59	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.238		0.341	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	Y		DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15		28.5	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.15	Y	=	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15		0.73	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.15	Y	=	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.238	U	0.119	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.81	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.18	U	0.09	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.72	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	UJ	0.095	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.549	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.185	U	0.0925	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	1.67	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.83	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.18	U	0.09	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.72	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	JH	7.91	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	Y		Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.85	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.18	U	0.09	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.69	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.18	U	0.09	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.74	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	UJ	0.1	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	1.86	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.79	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.83	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0793	N	U	CAPE 2006
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.258	UJ	0.129	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0793	N	U	CAPE 2006
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.15	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.092	U	0.046	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.461	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.095	U	0.0475	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.476	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.098	U	0.049	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.488	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.097	U	0.0485	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.476	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.098	U	0.049	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.49	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.099	U	0.0495	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.495	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.099	U	0.0495	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.493	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.091	U	0.0455	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.457	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.085	U	0.0425	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.427	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.093	U	0.0465	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.465	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.089	U	0.0445	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.444	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.099	U	0.0495	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.495	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.095	U	0.0475	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.476	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.098	U	0.049	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.49	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.092	U	0.046	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.418	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.238	UJ	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05		0.83	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	Y	=	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.238	U	0.119	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.095	U	0.0475	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.476	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.09	U	0.045	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.452	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.095	UJ	0.0475	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.476	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.092	U	0.046	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.439	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.096	U	0.048	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.481	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.09	U	0.045	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.452	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	JH	6.13	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	Y		Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.098	U	0.049	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.488	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.089	U	0.0445	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.444	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.092	U	0.046	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.459	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.098	UJ	0.049	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	0.49	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.094	U	0.047	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.472	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.096	U	0.048	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.481	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0793	N	U	CAPE 2006
1,3-Dinitrobenzene	99-65-0	mg/kg	0.258	UJ	0.129	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0793	N	U	CAPE 2006
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.18	U	0.09	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.461	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.476	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.488	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.195	U	0.0975	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.476	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.49	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.495	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.493	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.18	U	0.09	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.457	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.17	U	0.085	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.427	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.465	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.18	U	0.09	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.444	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.495	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.476	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.49	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.185	U	0.0925	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.418	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	1.19		14.7	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.475	Y	J	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.95	J	46	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	Y	DP	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	160		57000	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	160	Y	=	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1		45	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	Y	=	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1		3.9	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	Y	=	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.238	U	0.119	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.476	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.18	U	0.09	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.452	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	UJ	0.095	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.476	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.185	U	0.0925	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.439	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.481	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.18	U	0.09	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.452	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	24.9	J	195	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	9.95	Y		Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.488	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.18	U	0.09	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.444	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.18	U	0.09	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.459	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	UJ	0.1	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	0.49	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.472	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.481	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0737	N	U	CAPE 2006
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.258	UJ	0.129	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0737	N	U	CAPE 2006
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB01	LH01A-SB01-2001	SEMIVOLATILES	REG	15-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB01	LH01A-SB01-2002	SEMIVOLATILES	REG	15-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB02	LH01A-SB02-2001	SEMIVOLATILES	REG	14-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB02	LH01A-SB02-2002	SEMIVOLATILES	REG	14-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB03	LH01A-SB03-2001	SEMIVOLATILES	REG	14-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB03	LH01A-SB03-2002	SEMIVOLATILES	REG	14-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB04	AVG-LH01A-SB04-2001	SEMIVOLATILES	AVG	13-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SB04	LH01A-SB04-2002	SEMIVOLATILES	REG	13-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SD01	AVG-LH01A-SD01-3001	SEMIVOLATILES	AVG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SD02	LH01A-SD02-3001	SEMIVOLATILES	REG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01A-SD03	LH01A-SD03-3001	SEMIVOLATILES	REG	12-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01MW01	LH01A-MW01-2001	SEMIVOLATILES	REG	2-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.32	U	0.16	01MW01	LH01A-MW01-2002	SEMIVOLATILES	REG	2-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.66	U	0.33	01MW02	LH01A-MW02-2001	SEMIVOLATILES	REG	5-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01MW02	LH01A-MW02-2002	SEMIVOLATILES	REG	5-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01MW03	LH01A-MW03-2001	SEMIVOLATILES	REG	7-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01MW03	LH01A-MW03-2002	SEMIVOLATILES	REG	7-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01MW04	LH01A-MW04-2001	SEMIVOLATILES	REG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01MW04	LH01A-MW04-2002	SEMIVOLATILES	REG	10-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01MW05	LH01A-MW05-2001	SEMIVOLATILES	REG	8-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.32	U	0.16	01MW05	LH01A-MW05-2002	SEMIVOLATILES	REG	8-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB22	AVG-LH01-SB22 0-2.5	SEMIVOLATILES	AVG	15-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB23	LH01-SB23 0-2.5	SEMIVOLATILES	REG	15-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB24	LH01-SB24 0-2.5	SEMIVOLATILES	REG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB25	LH01-SB25 0-2.5	SEMIVOLATILES	REG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB26	AVG-LH01-SB26 0-2.5	SEMIVOLATILES	AVG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB27	LH01-SB27 0-2.5	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB28	C930319-01SB28-N00	SEMIVOLATILES	REG	19-Mar-93	0	0		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB28	LH01-SB28 (0-2.	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB29	C930330-01SB29-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SB29	LH01-SB29 (0-2.	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD06	LH01-SD06	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD07	C930318-01SD07-N00	SEMIVOLATILES	REG	18-Mar-93	0	0		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD07	LH01-SD07	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD08	AVG-30320-01SD08-N00	SEMIVOLATILES	AVG	20-Mar-93	0	0		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD08	AVG-LH01-SD08	SEMIVOLATILES	AVG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD09	C930318-01SD09-N00	SEMIVOLATILES	REG	18-Mar-93	0	0		N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD09	LH01-SD09	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD10	C930330-01SD10-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD10	LH01-SD10	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD11	C930330-01SD11-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD11	LH01-SD11	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD12	AVG-30330-01SD12-N00	SEMIVOLATILES	AVG	30-Mar-93	0	0		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	01SD12	LH01-SD12	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	03SB01	03SB01-01-R	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.105	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.187	U	0.0935	03SB01	03SB01-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0935	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.907	U	0.4535	03SB02	03SB02-01	SEMIVOLATILES	REG	29-Aug-06	0	0.5	0.453	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.7	U	0.85	03SB03	03SB03-01	SEMIVOLATILES	REG	29-Aug-06	0	0.5	0.85	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.596	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.616	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.631	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.195	U	0.0975	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.616	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.634	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.641	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.637	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.591	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.181	U	0.0905	06SB01	06SB01-01	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0904	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.191	U	0.0955	06SB02	06SB02-01	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0956	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.191	U	0.0955	06SB02	06SB02-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0955	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.182	U	0.091	06SB03	06SB03-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0908	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	07SB01	07SB01(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.0898	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	07SB02	07SB02(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.0901	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.415	U	0.2075	07SB03	07SB03(0-1)	SEMIVOLATILES	REG	28-Jun-06	0	1	0.207	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.975	U	0.4875	07SB04	07SB04(0-1)	SEMIVOLATILES	REG	28-Jun-06	0	1	0.488	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.172	U	0.086	07SB06	07SB06(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.086	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.17	U	0.085	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.553	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.602	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.575	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.641	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.616	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.634	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.185	U	0.0925	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.541	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.388	U	0.194	29SB01	29SB01(0-2)	SEMIVOLATILES	REG	18-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.375	U	0.1875	29SB02	29SB02(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.398	U	0.199	29SB03	29SB03(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.379	U	0.1895	29SB04	29SB04(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.407	U	0.2035	29SB05	29SB05(0-2)	SEMIVOLATILES	REG	27-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.384	U	0.192	29SB06	29SB06(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.384	U	0.192	29SB07	29SB07(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.402	U	0.201	29SB08	29SB08(0-2)	SEMIVOLATILES	REG	27-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.3975	U	0.19875	29SB09	AVG-29SB09(0-2)	SEMIVOLATILES	AVG	28-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.238	U	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.407	U	0.2035	29SB10	29SB10(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.371	U	0.1855	29SB11	29SB11(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.384	U	0.192	29SB12	29SB12(0-2)	SEMIVOLATILES	REG	30-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.384	U	0.192	29SB13	29SB13(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.384	U	0.192	29SB14	29SB14(0-2)	SEMIVOLATILES	REG	30-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.407	U	0.2035	29SB15	29SB15-(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.471	U	0.2355	29SD01	29SD01(0.5)	SEMIVOLATILES	REG	29-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.423	U	0.2115	29SD10	29SD10(0-0.5)	SEMIVOLATILES	REG	28-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.516	U	0.258	29SD11	29SD11(0-0.5)	SEMIVOLATILES	REG	28-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.333		1.2	29WL02	LH29-WL-02	SEMIVOLATILES	REG	13-May-93	0	0	-0.099	Y	=	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.388	U	0.194	32SB01	32SB01(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.402	U	0.201	32SB02	32SB02(0-2)	SEMIVOLATILES	REG	31-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.371	U	0.1855	32SB03	32SB03(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.398	U	0.199	32SB04	32SB04(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.471	U	0.2355	32SB05	32SB05(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.388	U	0.194	32SB06	32SB06(0-2)	SEMIVOLATILES	REG	1-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.4315	U	0.21575	32SB07	AVG-32SB07(0-2)	SEMIVOLATILES	AVG	18-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.423	U	0.2115	32SB08	32SB08(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.393	U	0.1965	32SB09	32SB09(0-2)	SEMIVOLATILES	REG	4-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.375	U	0.1875	32SB10	32SB10(0-2)	SEMIVOLATILES	REG	4-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.407	U	0.2035	32SB11	32SB11(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.363	U	0.1815	32SB12	32SB12(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.379	U	0.1895	32SB13	32SB13(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.493	U	0.2465	32SD05	32SD05(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.465	U	0.2325	32SD06	32SD06(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.524	U	0.262	32SD07	32SD07(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	2		7.6	32SS03	32SS03(0-0.5)	SEMIVOLATILES	REG	26-Jul-98	0	0.5	2	Y	=	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.361	U	0.1805	35SUMP022-SB01	35-SMP22-SB01-01	SEMIVOLATILES	REG	13-Sep-06	0.5	0.5	0.18	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.238	U	0.119	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.188	U	0.094	35SUMP036-SB01	35-SMP36-SB01-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0939	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.171	U	0.0855	35SUMP036-SB02	35-SMP36-SB02-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0857	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.182	U	0.091	35SUMP038-SB01	35-SMP38-SB01-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0908	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.181	U	0.0905	35SUMP038-SB01	35-SMP38-SB01-02	SEMIVOLATILES	REG	12-Sep-06	2.5	3	0.0905	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.378	U	0.189	35SUMP052-SB01	35-SMP052-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.189	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.174	U	0.087	35SUMP052-SB01	35-SMP052-SB01-02	SEMIVOLATILES	REG	19-Sep-06	3	3	0.0871	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	2.15	U	1.075	35SUMP056-SB01	35-SMP056-SB01-01	SEMIVOLATILES	REG	22-Sep-06	0.5	0.5	1.07	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.214	U	0.107	35SUMP056-SB01	35-SMP056-SB01-02	SEMIVOLATILES	REG	22-Sep-06	3	3	0.107	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.895	U	0.4475	35SUMP064-SB01	35-SMP064-SB01-01	SEMIVOLATILES	REG	20-Sep-06	1	1	0.447	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.186	U	0.093	35SUMP074-SB01	35-SMP074-SB01-01	SEMIVOLATILES	REG	21-Sep-06	0.5	0.5	0.0931	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.918	U	0.459	35SUMP074-SB02	35-SMP074-SB02-01	SEMIVOLATILES	REG	21-Sep-06	0.5	0.5	0.459	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.908	U	0.454	35SUMP088-SB01	35-SMP088-SB01-01	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.454	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.923	U	0.4615	35SUMP088-SB02	35-SMP088-SB02-01	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.461	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.182	U	0.091	35SUMP121-SB01	35-SMP121-SB01-01	SEMIVOLATILES	REG	14-Sep-06	0.5	0.5	0.0912	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.616	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.586	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	UJ	0.095	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.616	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.185	U	0.0925	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.568	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.622	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.586	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.181	U	0.0905	55SB02	55SB02-1-2	SEMIVOLATILES	REG	27-Sep-06	1	2	0.0903	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	55SB03	55-SB03-1-2	SEMIVOLATILES	REG	27-Sep-06	1	2	0.095	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.195	U	0.0975	55SB03	55-SB03-3.0	SEMIVOLATILES	REG	27-Sep-06	3	3	0.0974	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	2.49		82.1	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.995	Y		Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.177	U	0.0885	55SB05	55-SB05-1-2	SEMIVOLATILES	REG	28-Sep-06	1	2	0.0884	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.178	U	0.089	55SB05	55-SB05-2.5	SEMIVOLATILES	REG	28-Sep-06	2.5	2.5	0.089	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.918	U	0.459	64SB01	64SB01-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.459	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	64SB02	64SB02-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.19	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.918	U	0.459	64SB03	64SB03-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.459	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.631	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.575	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.594	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	UJ	0.1	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	0.634	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.61	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.622	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	1.82	U	0.91	68SB01	68SB01-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.909	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.194	U	0.097	68SB01	68SB01-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0972	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.917	U	0.4585	68SB02	68SB02-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.459	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.188	U	0.094	68SB02	68SB02-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0939	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.187	U	0.0935	68SB03	68SB03-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.0935	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.186	U	0.093	68SB03	68SB03-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0932	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0515	N	U	CAPE 2006
2,4-Dinitrotoluene	121-14-2	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0515	N	U	CAPE 2006
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.202	U	0.101	FWS-016	C-SS-016	SEMIVOLATILES	REG	27-Aug-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.3	U	0.15	FWS-021	C-SS-021	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.292	U	0.146	FWS-022	C-SS-022	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.352	U	0.176	FWS-025	C-SS-025	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.302	U	0.151	FWS-026	C-SS-026	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.328	U	0.164	FWS-029	C-SS-029	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.258	U	0.129	FWS-035	C-SS-035	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.306	U	0.153	FWS-036	C-SS-036	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.258	U	0.129	FWS-038	C-SS-038	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0319	U	0.01595	FWS-112	CLNWR112	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0303	U	0.01515	FWS-113	AVG-CLNWR113	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0303	U	0.01515	FWS-114	CLNWR114	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0292	U	0.0146	FWS-115	CLNWR115	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0299	U	0.01495	FWS-116	CLNWR116	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0313	U	0.01565	FWS-117	CLNWR117	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0273	U	0.01365	FWS-121	CLNWR121	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0398	U	0.0199	FWS-122	CLNWR122	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0383	U	0.01915	FWS-125	CLNWR125	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0291	U	0.01455	FWS-126	CLNWR126	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0316	U	0.0158	FWS-128	CLNWR128	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0342	U	0.0171	FWS-129	CLNWR129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0299	U	0.01495	FWS-130	CLNWR130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.031	U	0.0155	FWS-131	AVG-CLNWR131	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0313	U	0.01565	FWS-132	CLNWR132	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0333	U	0.01665	FWS-133	CLNWR133	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0326	U	0.0163	FWS-134	CLNWR134	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.02815	U	0.014075	FWS-160	AVG-CLNWR160	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0273	U	0.01365	FWS-161	CLNWR161	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0306	U	0.0153	FWS-164	CLNWR164	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0402	U	0.0201	FWS-165	CLNWR165	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03	U	0.015	FWS-166	CLNWR166	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.036	U	0.018	FWS-167	CLNWR167	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0313	U	0.01565	FWS-168	CLNWR168	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0302	U	0.0151	FWS-176	CLNWR176	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0328	U	0.0164	FWS-177	CLNWR177	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0261	U	0.01305	FWS-178	CLNWR178	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0335	U	0.01675	FWS-189	CLNWR189	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0334	U	0.0167	FWS-190	CLNWR190	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0319	U	0.01595	FWS-191	CLNWR191	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0308	U	0.0154	FWS-192	CLNWR192	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0321	U	0.01605	FWS-193	CLNWR193	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03155	U	0.015775	FWS-194	AVG-CLNWR194	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03	U	0.015	FWS-195	CLNWR195	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0311	U	0.01555	FWS-196	CLNWR196	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0298	U	0.0149	FWS-220	CLNWR220	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0289	U	0.01445	FWS-221	CLNWR221	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0325	U	0.01625	FWS-222	CLNWR222	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0397	U	0.01985	FWS-229	CLNWR229	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0304	U	0.0152	FWS-230	CLNWR230	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.03275	U	0.016375	FWS-231	AVG-CLNWR231	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0334	U	0.0167	FWS-233	CLNWR233	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0315	U	0.01575	FWS-234	CLNWR234	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	1.7	U	0.85	LAP-023	LAP-023A	SEMIVOLATILES	REG	10-Jul-00	0	0.5		N	U	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LAP-025	LAP-025A	SEMIVOLATILES	REG	10-Jul-00	0	0.5		N	U	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LAP-025	LAP-025B	SEMIVOLATILES	REG	10-Jul-00	1	1.5		N	U	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-DL063-01	LH-DL063-01	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-DL064-01	LH-DL064-01	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-DL065-01	AVG-LH-DL065-01	SEMIVOLATILES	AVG	5-Aug-93	1.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-DL072-01	LH-DL072-01	SEMIVOLATILES	REG	4-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-DL52-01	LH-DL52-01	SEMIVOLATILES	REG	3-Aug-93	1.3	1.7	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S01-01	LH-S01-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S01-02	LH-S01-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S02-01	LH-S02-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S02-02	LH-S02-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S062-01	AVG-LH-S062-01_1	SEMIVOLATILES	AVG	5-Aug-93	0.5	1.2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S062-01	LH-S062-01_2	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_1	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_2	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_3	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S064-01	LH-S064-01_1	SEMIVOLATILES	REG	5-Aug-93	1.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S064-01	LH-S064-01_3	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S064-02	LH-S064-02_1	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S064-02	LH-S064-02_2	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S065-01	LH-S065-01_1	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S065-01	LH-S065-01_2	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S065-02	LH-S065-02_1	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S072-01	LH-S072-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S072-02	LH-S072-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S10-01	LH-S10-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S102-01	AVG-LH-S102-01_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S102-02	LH-S102-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S103-01	LH-S103-01_1	SEMIVOLATILES	REG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S103-02	LH-S103-02_1	SEMIVOLATILES	REG	25-Jul-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S104-01	LH-S104-01_1	SEMIVOLATILES	REG	3-Aug-93	1.5	2.5	0.33	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S104-02	AVG-LH-S104-02_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S105-01	LH-S105-01_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S105-02	LH-S105-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S110-01	LH-S110-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S11-02	LH-S11-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S119-01	AVG-LH-S119-01_1	SEMIVOLATILES	AVG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S119-02	LH-S119-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S120-01	LH-S120-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S120-02	LH-S120-02 _1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S122-01	AVG-LH-S122-01_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	1.2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S122-02	LH-S122-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S23-02	LH-S23-02_1	SEMIVOLATILES	REG	25-Jul-93	1	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S38-01	LH-S38-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S40-01	LH-S40-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S52-01	LH-S52-01_1	SEMIVOLATILES	REG	3-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S52-01	LH-S52-01_2	SEMIVOLATILES	REG	3-Aug-93	1.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S86-02	LH-S86-02_1	SEMIVOLATILES	REG	27-Jul-93	0.5	2	0.33	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.5	U	0.25	LHSMW01	LHS-MW1	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.5	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW02	LHS-MW2	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW03	LHS-MW3	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.49	U	0.245	LHSMW04	LHS-MW4	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.49	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LHSMW05	LHS-MW5	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW06	LHS-MW6	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LHSMW07	LHS-MW7	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW08	LHS-MW8	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW09	LHS-MW9	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LHSMW10	LHS-MW10	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.39	U	0.195	LHSMW11	AVG-LHS-MW11	SEMIVOLATILES	AVG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LHSMW12	LHS-MW12	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW13	LHS-MW13	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW14	LHS-MW14	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LHSMW15	LHS-MW15	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW16	LHS-MW16	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW17	LHS-MW17	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW18	LHS-MW18	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW19	LHS-MW19	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.365	U	0.1825	LHSMW20	AVG-LHS-MW20	SEMIVOLATILES	AVG	3-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW21	LHS-MW21	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW22	LHS-MW22	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW23	LHS-MW23	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LHSMW24	LHS-MW24	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW25	LHS-MW25	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW26	LHS-MW26	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW27	LHS-MW27	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW28	LHS-MW28	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW29	LHS-MW29	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW30	AVG-LHS-MW30	SEMIVOLATILES	AVG	3-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW31	LHS-MW31	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW32	LHS-MW32	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW33	LHS-MW33	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LHSMW34	LHS-MW34	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.42	U	0.21	LHSMW35	LHS-MW35	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.42	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LHSMW36	LHS-MW36	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW37	LHS-MW37	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW38	LHS-MW38	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW39	LHS-MW39	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW40	AVG-LHS-MW40	SEMIVOLATILES	AVG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW41	LHS-MW41	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW42	LHS-MW42	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW43	LHS-MW43	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW44	LHS-MW44	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW45	LHS-MW45	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LHSMW46	LHS-MW46	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW47	LHS-MW47	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW48	LHS-MW48	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW49	LHS-MW49	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LHSMW50	AVG-LHS-MW50	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LHSMW51	LHS-MW51	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW52	LHS-MW52	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW53	LHS-MW53	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.4	U	0.2	LHSMW54	LHS-MW54	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.4	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW55	LHS-MW55	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW56	LHS-MW56	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LHSMW57	LHS-MW57	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.42	U	0.21	LHSMW58	LHS-MW58	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.42	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.38	U	0.19	LHSMW59	LHS-MW59	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.375	U	0.1875	LHSMW60	AVG-LHS-MW60	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW61	LHS-MW61	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.4	U	0.2	LHSMW62	LHS-MW62	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.4	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW63	LHS-MW63	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.39	U	0.195	LHSMW64	LHS-MW64	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.39	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW65	LHS-MW65	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW66	LHS-MW66	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.37	U	0.185	LHSMW67	LHS-MW67	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW68	LHS-MW68	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.35	U	0.175	LHSMW69	LHS-MW69	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.36	U	0.18	LHSMW70	AVG-LHS-MW70	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.34	U	0.17	LHSMW71	LHS-MW71	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.84	U	0.92	WRS011-SB01	WRS011-SB01-01	SEMIVOLATILES	REG	26-Sep-06	0.5	0.5	0.921	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.99	U	0.995	WRS011-SB02	WRS011-SB02-01	SEMIVOLATILES	REG	26-Sep-06	0.5	0.5	0.996	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.7	U	0.85	WRS015-SB01	WRS-015-SB01-01	SEMIVOLATILES	REG	15-Sep-06	0.5	0.5	0.85	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	3.46	U	1.73	WRS015-SB02	WRS-15-SB02-01	SEMIVOLATILES	REG	15-Sep-06	1	1	1.73	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.84	U	0.92	WRS04-SB01	WRS04-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.919	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.82	U	0.91	WRS06-SB01	WRS06-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.912	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.189	U	0.0945	WRS07-SB01	WRS07-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.0947	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.83	U	0.915	WRS07-SB02	WRS07-SB02-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.914	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.18	U	0.09	WRS09-SB01	WRS09-SB01-01	SEMIVOLATILES	REG	15-Sep-06	1	1	0.0899	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	1.74	U	0.87	WRS09-SB02	WRS09-SB02-01	SEMIVOLATILES	REG	15-Sep-06	0.5	0.5	0.871	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB01	LH01A-SB01-2001	SEMIVOLATILES	REG	15-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB01	LH01A-SB01-2002	SEMIVOLATILES	REG	15-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB02	LH01A-SB02-2001	SEMIVOLATILES	REG	14-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB02	LH01A-SB02-2002	SEMIVOLATILES	REG	14-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB03	LH01A-SB03-2001	SEMIVOLATILES	REG	14-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB03	LH01A-SB03-2002	SEMIVOLATILES	REG	14-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB04	AVG-LH01A-SB04-2001	SEMIVOLATILES	AVG	13-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SB04	LH01A-SB04-2002	SEMIVOLATILES	REG	13-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SD01	AVG-LH01A-SD01-3001	SEMIVOLATILES	AVG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SD02	LH01A-SD02-3001	SEMIVOLATILES	REG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01A-SD03	LH01A-SD03-3001	SEMIVOLATILES	REG	12-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01MW01	LH01A-MW01-2001	SEMIVOLATILES	REG	2-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.32	U	0.16	01MW01	LH01A-MW01-2002	SEMIVOLATILES	REG	2-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.66	U	0.33	01MW02	LH01A-MW02-2001	SEMIVOLATILES	REG	5-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01MW02	LH01A-MW02-2002	SEMIVOLATILES	REG	5-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01MW03	LH01A-MW03-2001	SEMIVOLATILES	REG	7-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01MW03	LH01A-MW03-2002	SEMIVOLATILES	REG	7-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01MW04	LH01A-MW04-2001	SEMIVOLATILES	REG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01MW04	LH01A-MW04-2002	SEMIVOLATILES	REG	10-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01MW05	LH01A-MW05-2001	SEMIVOLATILES	REG	8-Dec-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.32	U	0.16	01MW05	LH01A-MW05-2002	SEMIVOLATILES	REG	8-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB22	AVG-LH01-SB22 0-2.5	SEMIVOLATILES	AVG	15-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB23	LH01-SB23 0-2.5	SEMIVOLATILES	REG	15-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB24	LH01-SB24 0-2.5	SEMIVOLATILES	REG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB25	LH01-SB25 0-2.5	SEMIVOLATILES	REG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB26	AVG-LH01-SB26 0-2.5	SEMIVOLATILES	AVG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB27	LH01-SB27 0-2.5	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB28	C930319-01SB28-N00	SEMIVOLATILES	REG	19-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB28	LH01-SB28 (0-2.	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB29	C930330-01SB29-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SB29	LH01-SB29 (0-2.	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD06	LH01-SD06	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD07	C930318-01SD07-N00	SEMIVOLATILES	REG	18-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD07	LH01-SD07	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD08	AVG-30320-01SD08-N00	SEMIVOLATILES	AVG	20-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD08	AVG-LH01-SD08	SEMIVOLATILES	AVG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD09	C930318-01SD09-N00	SEMIVOLATILES	REG	18-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD09	LH01-SD09	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD10	C930330-01SD10-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD10	LH01-SD10	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD11	C930330-01SD11-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD11	LH01-SD11	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD12	AVG-30330-01SD12-N00	SEMIVOLATILES	AVG	30-Mar-93	0	0		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	01SD12	LH01-SD12	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	03SB01	03SB01-01-R	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.105	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.187	U	0.0935	03SB01	03SB01-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0935	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.907	U	0.4535	03SB02	03SB02-01	SEMIVOLATILES	REG	29-Aug-06	0	0.5	0.453	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.7	U	0.85	03SB03	03SB03-01	SEMIVOLATILES	REG	29-Aug-06	0	0.5	0.85	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	04SB03	04SB03(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.56	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.285	U	0.1425	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.857	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	04SB04	04SB04(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.547	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.295	U	0.1475	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.857	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	04SB05	04SB05(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.565	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	04SB05	04SB05(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.586	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	04SB06	04SB06(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.569	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	04SB06	04SB06(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.551	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.181	U	0.0905	06SB01	06SB01-01	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0904	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.255	U	0.1275	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.191	U	0.0955	06SB02	06SB02-01	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0956	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.191	U	0.0955	06SB02	06SB02-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0955	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.182	U	0.091	06SB03	06SB03-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0908	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.18	U	0.09	07SB01	07SB01(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.0898	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.18	U	0.09	07SB02	07SB02(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.0901	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.415	U	0.2075	07SB03	07SB03(0-1)	SEMIVOLATILES	REG	28-Jun-06	0	1	0.207	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.975	U	0.4875	07SB04	07SB04(0-1)	SEMIVOLATILES	REG	28-Jun-06	0	1	0.488	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.172	U	0.086	07SB06	07SB06(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.086	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	08SB01	08SB01(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.561	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	08SB03	08SB03(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.576	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	08SB03	08SB03(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.556	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	08SB04	08SB04(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.579	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	08SB04	08SB04(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.613	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	08SB05	08SB05(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.606	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	08SB05	AVG-08SB05(1-3)	SEMIVOLATILES	AVG	7-Dec-00	1	3	0.609	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.388	U	0.194	29SB01	29SB01(0-2)	SEMIVOLATILES	REG	18-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.375	U	0.1875	29SB02	29SB02(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.398	U	0.199	29SB03	29SB03(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.379	U	0.1895	29SB04	29SB04(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.407	U	0.2035	29SB05	29SB05(0-2)	SEMIVOLATILES	REG	27-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.384	U	0.192	29SB06	29SB06(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.384	U	0.192	29SB07	29SB07(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.402	U	0.201	29SB08	29SB08(0-2)	SEMIVOLATILES	REG	27-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.3975	U	0.19875	29SB09	AVG-29SB09(0-2)	SEMIVOLATILES	AVG	28-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.238	U	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.407	U	0.2035	29SB10	29SB10(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.371	U	0.1855	29SB11	29SB11(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.384	U	0.192	29SB12	29SB12(0-2)	SEMIVOLATILES	REG	30-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.384	U	0.192	29SB13	29SB13(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.236	J	0.109	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	Y	J	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.384	U	0.192	29SB14	29SB14(0-2)	SEMIVOLATILES	REG	30-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.228	J	0.121	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	Y	J	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.407	U	0.2035	29SB15	29SB15-(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.471	U	0.2355	29SD01	29SD01(0.5)	SEMIVOLATILES	REG	29-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.423	U	0.2115	29SD10	29SD10(0-0.5)	SEMIVOLATILES	REG	28-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.516	U	0.258	29SD11	29SD11(0-0.5)	SEMIVOLATILES	REG	28-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.347	U	0.1735	29WL02	LH29-WL-02	SEMIVOLATILES	REG	13-May-93	0	0	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.227	J	0.131	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	Y	J	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.388	U	0.194	32SB01	32SB01(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.402	U	0.201	32SB02	32SB02(0-2)	SEMIVOLATILES	REG	31-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.371	U	0.1855	32SB03	32SB03(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.398	U	0.199	32SB04	32SB04(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.471	U	0.2355	32SB05	32SB05(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.388	U	0.194	32SB06	32SB06(0-2)	SEMIVOLATILES	REG	1-Jun-93	0	2	-0.099	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.4315	U	0.21575	32SB07	AVG-32SB07(0-2)	SEMIVOLATILES	AVG	18-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.423	U	0.2115	32SB08	32SB08(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.393	U	0.1965	32SB09	32SB09(0-2)	SEMIVOLATILES	REG	4-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.375	U	0.1875	32SB10	32SB10(0-2)	SEMIVOLATILES	REG	4-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.407	U	0.2035	32SB11	32SB11(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.363	U	0.1815	32SB12	32SB12(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.379	U	0.1895	32SB13	32SB13(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.493	U	0.2465	32SD05	32SD05(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.465	U	0.2325	32SD06	32SD06(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.524	U	0.262	32SD07	32SD07(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.4		0.73	32SS03	32SS03(0-0.5)	SEMIVOLATILES	REG	26-Jul-98	0	0.5	0.4	Y	=	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.361	U	0.1805	35SUMP022-SB01	35-SMP22-SB01-01	SEMIVOLATILES	REG	13-Sep-06	0.5	0.5	0.18	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.252	U	0.126	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.257	U	0.1285	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.188	U	0.094	35SUMP036-SB01	35-SMP36-SB01-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0939	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.171	U	0.0855	35SUMP036-SB02	35-SMP36-SB02-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0857	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.182	U	0.091	35SUMP038-SB01	35-SMP38-SB01-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0908	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.181	U	0.0905	35SUMP038-SB01	35-SMP38-SB01-02	SEMIVOLATILES	REG	12-Sep-06	2.5	3	0.0905	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.378	U	0.189	35SUMP052-SB01	35-SMP052-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.189	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.174	U	0.087	35SUMP052-SB01	35-SMP052-SB01-02	SEMIVOLATILES	REG	19-Sep-06	3	3	0.0871	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	2.15	U	1.075	35SUMP056-SB01	35-SMP056-SB01-01	SEMIVOLATILES	REG	22-Sep-06	0.5	0.5	1.07	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.214	U	0.107	35SUMP056-SB01	35-SMP056-SB01-02	SEMIVOLATILES	REG	22-Sep-06	3	3	0.107	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.895	U	0.4475	35SUMP064-SB01	35-SMP064-SB01-01	SEMIVOLATILES	REG	20-Sep-06	1	1	0.447	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.186	U	0.093	35SUMP074-SB01	35-SMP074-SB01-01	SEMIVOLATILES	REG	21-Sep-06	0.5	0.5	0.0931	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.918	U	0.459	35SUMP074-SB02	35-SMP074-SB02-01	SEMIVOLATILES	REG	21-Sep-06	0.5	0.5	0.459	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.908	U	0.454	35SUMP088-SB01	35-SMP088-SB01-01	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.454	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.923	U	0.4615	35SUMP088-SB02	35-SMP088-SB02-01	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.461	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.252	U	0.126	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.255	U	0.1275	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.252	U	0.126	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.182	U	0.091	35SUMP121-SB01	35-SMP121-SB01-01	SEMIVOLATILES	REG	14-Sep-06	0.5	0.5	0.0912	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.13	U	0.065	49SB34	49SB34(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.639	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	49SB34	49SB34(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.547	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	49SB35	49SB35(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.624	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.125	U	0.0625	49SB35	AVG-49SB35(0-0.5)	SEMIVOLATILES	AVG	7-Dec-00	0	0.5	0.633	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	49SB36	49SB36(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.62	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	49SB36	49SB36(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.603	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.181	U	0.0905	55SB02	55SB02-1-2	SEMIVOLATILES	REG	27-Sep-06	1	2	0.0903	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.19	U	0.095	55SB03	55-SB03-1-2	SEMIVOLATILES	REG	27-Sep-06	1	2	0.095	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.195	U	0.0975	55SB03	55-SB03-3.0	SEMIVOLATILES	REG	27-Sep-06	3	3	0.0974	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.177	U	0.0885	55SB05	55-SB05-1-2	SEMIVOLATILES	REG	28-Sep-06	1	2	0.0884	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.178	U	0.089	55SB05	55-SB05-2.5	SEMIVOLATILES	REG	28-Sep-06	2.5	2.5	0.089	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.918	U	0.459	64SB01	64SB01-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.459	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	64SB02	64SB02-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.19	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.918	U	0.459	64SB03	64SB03-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.459	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	67SB01	67SB01(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.571	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	67SB01	67SB01(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.571	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.28	U	0.14	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.826	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.11	U	0.055	67SB02	67SB02(1-2)	SEMIVOLATILES	REG	6-Dec-00	1	2	0.557	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	67SB03	67SB03(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.583	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.12	U	0.06	67SB03	67SB03(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.588	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	1.82	U	0.91	68SB01	68SB01-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.909	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.194	U	0.097	68SB01	68SB01-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0972	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.917	U	0.4585	68SB02	68SB02-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.459	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.188	U	0.094	68SB02	68SB02-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0939	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.187	U	0.0935	68SB03	68SB03-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.0935	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.186	U	0.093	68SB03	68SB03-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0932	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.147	UJ	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0687	N	U	CAPE 2006
2,6-Dinitrotoluene	606-20-2	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0687	N	U	CAPE 2006
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.202	U	0.101	FWS-016	C-SS-016	SEMIVOLATILES	REG	27-Aug-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.3	U	0.15	FWS-021	C-SS-021	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.292	U	0.146	FWS-022	C-SS-022	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.352	U	0.176	FWS-025	C-SS-025	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.302	U	0.151	FWS-026	C-SS-026	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.328	U	0.164	FWS-029	C-SS-029	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.258	U	0.129	FWS-035	C-SS-035	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.306	U	0.153	FWS-036	C-SS-036	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.258	U	0.129	FWS-038	C-SS-038	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0319	U	0.01595	FWS-112	CLNWR112	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0303	U	0.01515	FWS-113	AVG-CLNWR113	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0303	U	0.01515	FWS-114	CLNWR114	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0292	U	0.0146	FWS-115	CLNWR115	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0299	U	0.01495	FWS-116	CLNWR116	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0313	U	0.01565	FWS-117	CLNWR117	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0273	U	0.01365	FWS-121	CLNWR121	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0398	U	0.0199	FWS-122	CLNWR122	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0383	U	0.01915	FWS-125	CLNWR125	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0291	U	0.01455	FWS-126	CLNWR126	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0316	U	0.0158	FWS-128	CLNWR128	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0342	U	0.0171	FWS-129	CLNWR129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0299	U	0.01495	FWS-130	CLNWR130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.031	U	0.0155	FWS-131	AVG-CLNWR131	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0313	U	0.01565	FWS-132	CLNWR132	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0333	U	0.01665	FWS-133	CLNWR133	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0326	U	0.0163	FWS-134	CLNWR134	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.02815	U	0.014075	FWS-160	AVG-CLNWR160	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0273	U	0.01365	FWS-161	CLNWR161	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0306	U	0.0153	FWS-164	CLNWR164	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0402	U	0.0201	FWS-165	CLNWR165	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03	U	0.015	FWS-166	CLNWR166	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.036	U	0.018	FWS-167	CLNWR167	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0313	U	0.01565	FWS-168	CLNWR168	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0302	U	0.0151	FWS-176	CLNWR176	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0328	U	0.0164	FWS-177	CLNWR177	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0261	U	0.01305	FWS-178	CLNWR178	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0335	U	0.01675	FWS-189	CLNWR189	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0334	U	0.0167	FWS-190	CLNWR190	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0319	U	0.01595	FWS-191	CLNWR191	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0308	U	0.0154	FWS-192	CLNWR192	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0321	U	0.01605	FWS-193	CLNWR193	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03155	U	0.015775	FWS-194	AVG-CLNWR194	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03	U	0.015	FWS-195	CLNWR195	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0311	U	0.01555	FWS-196	CLNWR196	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0298	U	0.0149	FWS-220	CLNWR220	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0289	U	0.01445	FWS-221	CLNWR221	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0325	U	0.01625	FWS-222	CLNWR222	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0397	U	0.01985	FWS-229	CLNWR229	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0304	U	0.0152	FWS-230	CLNWR230	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.03275	U	0.016375	FWS-231	AVG-CLNWR231	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0334	U	0.0167	FWS-233	CLNWR233	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0315	U	0.01575	FWS-234	CLNWR234	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	1.7	U	0.85	LAP-023	LAP-023A	SEMIVOLATILES	REG	10-Jul-00	0	0.5		N	U	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LAP-025	LAP-025A	SEMIVOLATILES	REG	10-Jul-00	0	0.5		N	U	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-DL064-01	LH-DL064-01	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-DL065-01	AVG-LH-DL065-01	SEMIVOLATILES	AVG	5-Aug-93	1.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-DL072-01	LH-DL072-01	SEMIVOLATILES	REG	4-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-DL52-01	LH-DL52-01	SEMIVOLATILES	REG	3-Aug-93	1.3	1.7	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S01-01	LH-S01-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S01-02	LH-S01-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S02-01	LH-S02-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S02-02	LH-S02-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S062-01	LH-S062-01_2	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_1	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_2	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_3	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S064-01	LH-S064-01_1	SEMIVOLATILES	REG	5-Aug-93	1.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S064-01	LH-S064-01_3	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S064-02	LH-S064-02_1	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S064-02	LH-S064-02_2	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S065-01	LH-S065-01_1	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S065-01	LH-S065-01_2	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S065-02	LH-S065-02_1	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S072-01	LH-S072-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S072-02	LH-S072-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	J	0.16	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	Y	J	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S10-01	LH-S10-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S102-01	AVG-LH-S102-01_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S102-02	LH-S102-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S103-01	LH-S103-01_1	SEMIVOLATILES	REG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S103-02	LH-S103-02_1	SEMIVOLATILES	REG	25-Jul-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S104-01	LH-S104-01_1	SEMIVOLATILES	REG	3-Aug-93	1.5	2.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S104-02	AVG-LH-S104-02_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S105-01	LH-S105-01_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S105-02	LH-S105-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S110-01	LH-S110-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S11-02	LH-S11-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S119-01	AVG-LH-S119-01_1	SEMIVOLATILES	AVG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S119-02	LH-S119-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S120-01	LH-S120-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S120-02	LH-S120-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S122-01	AVG-LH-S122-01_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	1.2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S122-02	LH-S122-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S23-02	LH-S23-02_1	SEMIVOLATILES	REG	25-Jul-93	1	1.5	0.33	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S38-01	LH-S38-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S40-01	LH-S40-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S52-01	LH-S52-01_1	SEMIVOLATILES	REG	3-Aug-93	0.5	1	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S52-01	LH-S52-01_2	SEMIVOLATILES	REG	3-Aug-93	1.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	J	0.132	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	Y	J	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S86-02	LH-S86-02_1	SEMIVOLATILES	REG	27-Jul-93	0.5	2	0.33	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.5	U	0.25	LHSMW01	LHS-MW1	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.5	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	J	0.141	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	Y	J	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW02	LHS-MW2	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	J	0.181	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	Y	J	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW03	LHS-MW3	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.49	U	0.245	LHSMW04	LHS-MW4	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.49	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LHSMW05	LHS-MW5	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW06	LHS-MW6	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LHSMW07	LHS-MW7	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW08	LHS-MW8	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW09	LHS-MW9	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LHSMW10	LHS-MW10	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.39	U	0.195	LHSMW11	AVG-LHS-MW11	SEMIVOLATILES	AVG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LHSMW12	LHS-MW12	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW13	LHS-MW13	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW14	LHS-MW14	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LHSMW15	LHS-MW15	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW16	LHS-MW16	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW17	LHS-MW17	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW18	LHS-MW18	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW19	LHS-MW19	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.365	U	0.1825	LHSMW20	AVG-LHS-MW20	SEMIVOLATILES	AVG	3-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW21	LHS-MW21	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW22	LHS-MW22	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW23	LHS-MW23	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LHSMW24	LHS-MW24	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW25	LHS-MW25	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW26	LHS-MW26	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW27	LHS-MW27	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW28	LHS-MW28	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW29	LHS-MW29	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW30	AVG-LHS-MW30	SEMIVOLATILES	AVG	3-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW31	LHS-MW31	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW32	LHS-MW32	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW33	LHS-MW33	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LHSMW34	LHS-MW34	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.42	U	0.21	LHSMW35	LHS-MW35	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.42	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LHSMW36	LHS-MW36	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW37	LHS-MW37	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW38	LHS-MW38	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW39	LHS-MW39	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW40	AVG-LHS-MW40	SEMIVOLATILES	AVG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW41	LHS-MW41	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW42	LHS-MW42	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW43	LHS-MW43	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW44	LHS-MW44	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW45	LHS-MW45	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LHSMW46	LHS-MW46	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW47	LHS-MW47	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW48	LHS-MW48	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW49	LHS-MW49	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LHSMW50	AVG-LHS-MW50	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LHSMW51	LHS-MW51	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW52	LHS-MW52	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW53	LHS-MW53	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.4	U	0.2	LHSMW54	LHS-MW54	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.4	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW55	LHS-MW55	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW56	LHS-MW56	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LHSMW57	LHS-MW57	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.42	U	0.21	LHSMW58	LHS-MW58	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.42	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.38	U	0.19	LHSMW59	LHS-MW59	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.375	U	0.1875	LHSMW60	AVG-LHS-MW60	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW61	LHS-MW61	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.4	U	0.2	LHSMW62	LHS-MW62	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.4	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW63	LHS-MW63	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.39	U	0.195	LHSMW64	LHS-MW64	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.39	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW65	LHS-MW65	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW66	LHS-MW66	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.37	U	0.185	LHSMW67	LHS-MW67	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW68	LHS-MW68	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.35	U	0.175	LHSMW69	LHS-MW69	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.36	U	0.18	LHSMW70	AVG-LHS-MW70	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.34	U	0.17	LHSMW71	LHS-MW71	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.34	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.13	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.12	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.12	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.12	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.12	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.12	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.12	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.11	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.12	N	U	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.255	U	0.1275	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.84	U	0.92	WRS011-SB01	WRS011-SB01-01	SEMIVOLATILES	REG	26-Sep-06	0.5	0.5	0.921	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.99	U	0.995	WRS011-SB02	WRS011-SB02-01	SEMIVOLATILES	REG	26-Sep-06	0.5	0.5	0.996	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.7	U	0.85	WRS015-SB01	WRS-015-SB01-01	SEMIVOLATILES	REG	15-Sep-06	0.5	0.5	0.85	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	3.46	U	1.73	WRS015-SB02	WRS-15-SB02-01	SEMIVOLATILES	REG	15-Sep-06	1	1	1.73	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.26	U	0.13	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.257	U	0.1285	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.84	U	0.92	WRS04-SB01	WRS04-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.919	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.82	U	0.91	WRS06-SB01	WRS06-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.912	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.189	U	0.0945	WRS07-SB01	WRS07-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.0947	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.83	U	0.915	WRS07-SB02	WRS07-SB02-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.914	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.18	U	0.09	WRS09-SB01	WRS09-SB01-01	SEMIVOLATILES	REG	15-Sep-06	1	1	0.0899	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	1.74	U	0.87	WRS09-SB02	WRS09-SB02-01	SEMIVOLATILES	REG	15-Sep-06	0.5	0.5	0.871	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.255	U	0.1275	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.092	U	0.046	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.829	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.095	U	0.0475	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.857	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.098	U	0.049	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.878	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.097	U	0.0485	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.857	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.098	U	0.049	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.882	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.099	U	0.0495	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.891	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.099	U	0.0495	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.887	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.091	U	0.0455	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.822	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.255	U	0.1275	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.085	U	0.0425	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.427	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.093	U	0.0465	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.837	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.089	U	0.0445	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.8	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.099	U	0.0495	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.891	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.095	U	0.0475	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.476	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.098	U	0.049	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.882	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.092	U	0.046	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.753	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.238		0.254	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	Y		DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.19	J	2.6	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	Y	P	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.257	U	0.1285	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.255	U	0.1275	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.095	U	0.0475	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.857	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.09	U	0.045	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.814	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.095	UJ	0.0475	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.476	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.092	U	0.046	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.789	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.096	U	0.048	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.865	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.09	U	0.045	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.814	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.26	U	0.13	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.257	U	0.1285	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.098	U	0.049	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.878	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.089	U	0.0445	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.8	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.092	U	0.046	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.826	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.098	UJ	0.049	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	0.882	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.094	U	0.047	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.849	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.096	U	0.048	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.865	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0784	N	U	CAPE 2006
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0784	N	U	CAPE 2006
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	UJ	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.255	U	0.1275	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.26	U	0.13	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.257	U	0.1285	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.255	U	0.1275	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Nitrotoluene	88-72-2	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.46	U	0.23	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.475	U	0.2375	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.04	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.49	U	0.245	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.06	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.49	U	0.245	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.04	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.49	U	0.245	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.07	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.5	U	0.25	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.08	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.49	U	0.245	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.07	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.46	U	0.23	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.995	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.43	U	0.215	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.932	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.47	U	0.235	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.01	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.44	U	0.22	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.969	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.5	U	0.25	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.08	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.48	U	0.24	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.04	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.49	U	0.245	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.07	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.46	U	0.23	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.912	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.238	UJ	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.238	U	0.119	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.48	U	0.24	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.04	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.45	U	0.225	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.986	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.48	UJ	0.24	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.04	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.46	U	0.23	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.956	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.48	U	0.24	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.05	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.45	U	0.225	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.986	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	UJL	0.125	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.249	UJL	0.1245	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.239	UJL	0.1195	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.242	UJL	0.121	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.49	U	0.245	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.06	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.44	U	0.22	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.969	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.46	U	0.23	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.49	UJ	0.245	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	1.07	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.47	U	0.235	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.03	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.48	U	0.24	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.05	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0779	N	U	CAPE 2006
2-Nitrotoluene	88-72-2	mg/kg	0.258	UJ	0.129	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0779	N	U	CAPE 2006
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2-Nitrotoluene	88-72-2	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.25	UJ	0.125	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.24	UJ	0.12	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.248	UJ	0.124	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.245	UJ	0.1225	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.37	U	0.185	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.888	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.38	U	0.19	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.918	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.39	U	0.195	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.94	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.39	U	0.195	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.918	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.39	U	0.195	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.945	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.4	U	0.2	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.954	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.39	U	0.195	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.95	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.37	U	0.185	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.88	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.34	U	0.17	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.824	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.37	U	0.185	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.897	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.36	U	0.18	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.857	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.4	U	0.2	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.954	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.38	U	0.19	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.918	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.39	U	0.195	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.945	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.365	U	0.1825	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.807	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.238	UJ	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.238	U	0.119	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.38	U	0.19	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.918	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.36	U	0.18	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.872	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.38	UJ	0.19	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.918	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.365	U	0.1825	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.846	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.38	U	0.19	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.927	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.36	U	0.18	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.872	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.39	U	0.195	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.94	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.36	U	0.18	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.857	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.37	U	0.185	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.884	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.39	UJ	0.195	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	0.945	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.38	U	0.19	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.909	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.38	U	0.19	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.927	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0628	N	U	CAPE 2006
3-Nitrotoluene	99-08-1	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0628	N	U	CAPE 2006
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.46	U	0.23	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.986	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.475	U	0.2375	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.02	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.49	U	0.245	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.04	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.49	U	0.245	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.02	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.49	U	0.245	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.5	U	0.25	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.06	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.49	U	0.245	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.46	U	0.23	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.977	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.255	U	0.1275	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.43	U	0.215	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.915	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.47	U	0.235	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.995	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.44	U	0.22	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.951	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.5	U	0.25	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.06	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.48	U	0.24	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.02	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.49	U	0.245	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.46	U	0.23	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.895	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.238		0.289	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	Y		DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.257	U	0.1285	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.255	U	0.1275	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.48	U	0.24	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.02	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.45	U	0.225	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.968	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.48	UJ	0.24	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.02	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.46	U	0.23	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.939	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.48	U	0.24	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.03	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.45	U	0.225	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.968	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.26	U	0.13	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.257	U	0.1285	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.49	U	0.245	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.04	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.44	U	0.22	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.951	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.46	U	0.23	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.982	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.49	UJ	0.245	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	1.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.47	U	0.235	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.01	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.48	U	0.24	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.03	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.147	UJ	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0688	N	U	CAPE 2006
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0688	N	U	CAPE 2006
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	UJ	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.255	U	0.1275	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.26	U	0.13	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	UJ	0.125	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.257	UJ	0.1285	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.255	U	0.1275	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.46	U	0.23	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.01	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.475	U	0.2375	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.05	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.49	U	0.245	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.07	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.49	U	0.245	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	1.05	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.49	U	0.245	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.08	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.5	U	0.25	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.09	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.49	U	0.245	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.08	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.46	U	0.23	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.249	UJ	0.1245	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.245	UJ	0.1225	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.242	UJ	0.121	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.244	UJ	0.122	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.249	UJ	0.1245	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.239	UJ	0.1195	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.43	U	0.215	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.829	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.47	U	0.235	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.02	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.44	U	0.22	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.978	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.5	U	0.25	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.09	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.48	U	0.24	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.924	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.49	U	0.245	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.08	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.46	U	0.23	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.921	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.238	U	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.238	U	0.119	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.242		2.92	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	Y		Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.48	U	0.24	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.05	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.45	U	0.225	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.995	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.48	UJ	0.24	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.924	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.46	U	0.23	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.965	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.48	U	0.24	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.06	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.45	U	0.225	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.995	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.49	U	0.245	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.07	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.44	U	0.22	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.978	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.46	U	0.23	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	1.01	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.49	UJ	0.245	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	1.08	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.47	U	0.235	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	1.04	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.48	U	0.24	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.06	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0595	N	U	CAPE 2006
4-Nitrotoluene	99-99-0	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0595	N	U	CAPE 2006
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.24	UJ	0.12	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.248	UJ	0.124	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.28	U	0.14	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	2.03	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.285	U	0.1425	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	2.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	2.15	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.295	U	0.1475	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	2.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	2.16	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.3	U	0.15	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	2.18	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.3	U	0.15	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	2.17	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
HMX	2691-41-0	mg/kg	0.27	U	0.135	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	2.01	N	<	BERA EXP
HMX	2691-41-0	mg/kg	2.19	U	1.095	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.16	U	1.08	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.13	U	1.065	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.15	U	1.075	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.19	U	1.095	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.11	U	1.055	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.26	U	0.13	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.427	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.28	U	0.14	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	2.05	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.27	U	0.135	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.96	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.3	U	0.15	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	2.18	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.476	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	2.16	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.275	U	0.1375	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	1.84	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.238	U	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	2.19	U	1.095	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.1	U	1.05	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.14	U	1.07	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.19	U	1.095	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.18	U	1.09	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.14	U	1.07	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.16	U	1.08	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.11	U	1.055	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.13	U	1.065	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.14	U	1.07	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	2.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.27	U	0.135	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.99	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	UJ	0.145	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.476	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.275	U	0.1375	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	1.93	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	2.12	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.27	U	0.135	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	1.99	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	2.2	U	1.1	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.14	U	1.07	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.18	U	1.09	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.19	U	1.095	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.19	U	1.095	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.11	U	1.055	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.13	U	1.065	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
HMX	2691-41-0	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	2.15	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
HMX	2691-41-0	mg/kg	0.27	U	0.135	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	1.96	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.28	U	0.14	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	2.02	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	UJ	0.145	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	2.16	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.28	U	0.14	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	2.08	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.29	U	0.145	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	2.12	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0707	N	U	CAPE 2006
HMX	2691-41-0	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0707	N	U	CAPE 2006
HMX	2691-41-0	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
HMX	2691-41-0	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
HMX	2691-41-0	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
HMX	2691-41-0	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
HMX	2691-41-0	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
HMX	2691-41-0	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
HMX	2691-41-0	mg/kg	2.16	U	1.08	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.13	U	1.065	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.19	U	1.095	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.2	U	1.1	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.12	U	1.06	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.18	U	1.09	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.16	U	1.08	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.12	U	1.06	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
HMX	2691-41-0	mg/kg	2.13	U	1.065	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB01	LH01A-SB01-2001	SEMIVOLATILES	REG	15-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB01	LH01A-SB01-2002	SEMIVOLATILES	REG	15-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB02	LH01A-SB02-2001	SEMIVOLATILES	REG	14-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB02	LH01A-SB02-2002	SEMIVOLATILES	REG	14-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB03	LH01A-SB03-2001	SEMIVOLATILES	REG	14-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB03	LH01A-SB03-2002	SEMIVOLATILES	REG	14-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB04	AVG-LH01A-SB04-2001	SEMIVOLATILES	AVG	13-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SB04	LH01A-SB04-2002	SEMIVOLATILES	REG	13-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SD01	AVG-LH01A-SD01-3001	SEMIVOLATILES	AVG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SD02	LH01A-SD02-3001	SEMIVOLATILES	REG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01A-SD03	LH01A-SD03-3001	SEMIVOLATILES	REG	12-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01MW01	LH01A-MW01-2001	SEMIVOLATILES	REG	2-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.32	U	0.16	01MW01	LH01A-MW01-2002	SEMIVOLATILES	REG	2-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.66	U	0.33	01MW02	LH01A-MW02-2001	SEMIVOLATILES	REG	5-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01MW02	LH01A-MW02-2002	SEMIVOLATILES	REG	5-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01MW03	LH01A-MW03-2001	SEMIVOLATILES	REG	7-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01MW03	LH01A-MW03-2002	SEMIVOLATILES	REG	7-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01MW04	LH01A-MW04-2001	SEMIVOLATILES	REG	10-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01MW04	LH01A-MW04-2002	SEMIVOLATILES	REG	10-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01MW05	LH01A-MW05-2001	SEMIVOLATILES	REG	8-Dec-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.32	U	0.16	01MW05	LH01A-MW05-2002	SEMIVOLATILES	REG	8-Dec-93	2.5	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB22	AVG-LH01-SB22 0-2.5	SEMIVOLATILES	AVG	15-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB23	LH01-SB23 0-2.5	SEMIVOLATILES	REG	15-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB24	LH01-SB24 0-2.5	SEMIVOLATILES	REG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB25	LH01-SB25 0-2.5	SEMIVOLATILES	REG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB26	AVG-LH01-SB26 0-2.5	SEMIVOLATILES	AVG	16-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB27	LH01-SB27 0-2.5	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB28	C930319-01SB28-N00	SEMIVOLATILES	REG	19-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB28	LH01-SB28 (0-2.	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB29	C930330-01SB29-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SB29	LH01-SB29 (0-2.	SEMIVOLATILES	REG	17-Mar-93	0	2.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD06	LH01-SD06	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD07	C930318-01SD07-N00	SEMIVOLATILES	REG	18-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD07	LH01-SD07	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD08	AVG-30320-01SD08-N00	SEMIVOLATILES	AVG	20-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD08	AVG-LH01-SD08	SEMIVOLATILES	AVG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD09	C930318-01SD09-N00	SEMIVOLATILES	REG	18-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD09	LH01-SD09	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD10	C930330-01SD10-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD10	LH01-SD10	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD11	C930330-01SD11-N00	SEMIVOLATILES	REG	30-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD11	LH01-SD11	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD12	AVG-30330-01SD12-N00	SEMIVOLATILES	AVG	30-Mar-93	0	0		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	01SD12	LH01-SD12	SEMIVOLATILES	REG	31-Mar-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	03SB01	03SB01-01-R	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.105	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.187	U	0.0935	03SB01	03SB01-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0935	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.907	U	0.4535	03SB02	03SB02-01	SEMIVOLATILES	REG	29-Aug-06	0	0.5	0.453	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.7	U	0.85	03SB03	03SB03-01	SEMIVOLATILES	REG	29-Aug-06	0	0.5	0.85	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	04SB03	04SB03(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.56	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.285	U	0.1425	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.476	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	04SB04	04SB04(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.547	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.295	U	0.1475	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.476	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	04SB05	04SB05(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.565	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	04SB05	04SB05(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.586	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	04SB06	04SB06(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.569	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	04SB06	04SB06(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.551	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.181	U	0.0905	06SB01	06SB01-01	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0904	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.255	U	0.1275	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.127	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.191	U	0.0955	06SB02	06SB02-01	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0956	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.191	U	0.0955	06SB02	06SB02-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0955	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.182	U	0.091	06SB03	06SB03-02	SEMIVOLATILES	REG	29-Aug-06	0	0	0.0908	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.18	U	0.09	07SB01	07SB01(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.0898	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.18	U	0.09	07SB02	07SB02(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.0901	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.415	U	0.2075	07SB03	07SB03(0-1)	SEMIVOLATILES	REG	28-Jun-06	0	1	0.207	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.975	U	0.4875	07SB04	07SB04(0-1)	SEMIVOLATILES	REG	28-Jun-06	0	1	0.488	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.172	U	0.086	07SB06	07SB06(0-1)	SEMIVOLATILES	REG	29-Jun-06	0	1	0.086	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	08SB01	08SB01(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.561	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	08SB03	08SB03(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.576	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	08SB03	08SB03(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.556	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	08SB04	08SB04(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.579	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	08SB04	08SB04(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.613	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	08SB05	08SB05(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.606	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	08SB05	AVG-08SB05(1-3)	SEMIVOLATILES	AVG	7-Dec-00	1	3	0.609	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.388	U	0.194	29SB01	29SB01(0-2)	SEMIVOLATILES	REG	18-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.375	U	0.1875	29SB02	29SB02(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.398	U	0.199	29SB03	29SB03(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.379	U	0.1895	29SB04	29SB04(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.407	U	0.2035	29SB05	29SB05(0-2)	SEMIVOLATILES	REG	27-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.384	U	0.192	29SB06	29SB06(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.384	U	0.192	29SB07	29SB07(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.402	U	0.201	29SB08	29SB08(0-2)	SEMIVOLATILES	REG	27-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.3975	U	0.19875	29SB09	AVG-29SB09(0-2)	SEMIVOLATILES	AVG	28-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.238	U	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.407	U	0.2035	29SB10	29SB10(0-2)	SEMIVOLATILES	REG	19-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.371	U	0.1855	29SB11	29SB11(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.384	U	0.192	29SB12	29SB12(0-2)	SEMIVOLATILES	REG	30-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.384	U	0.192	29SB13	29SB13(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.384	U	0.192	29SB14	29SB14(0-2)	SEMIVOLATILES	REG	30-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.407	U	0.2035	29SB15	29SB15-(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.471	U	0.2355	29SD01	29SD01(0.5)	SEMIVOLATILES	REG	29-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.423	U	0.2115	29SD10	29SD10(0-0.5)	SEMIVOLATILES	REG	28-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.516	U	0.258	29SD11	29SD11(0-0.5)	SEMIVOLATILES	REG	28-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.347	U	0.1735	29WL02	LH29-WL-02	SEMIVOLATILES	REG	13-May-93	0	0	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.388	U	0.194	32SB01	32SB01(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.402	U	0.201	32SB02	32SB02(0-2)	SEMIVOLATILES	REG	31-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.371	U	0.1855	32SB03	32SB03(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.398	U	0.199	32SB04	32SB04(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.471	U	0.2355	32SB05	32SB05(0-2)	SEMIVOLATILES	REG	29-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.388	U	0.194	32SB06	32SB06(0-2)	SEMIVOLATILES	REG	1-Jun-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.4315	U	0.21575	32SB07	AVG-32SB07(0-2)	SEMIVOLATILES	AVG	18-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.423	U	0.2115	32SB08	32SB08(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.393	U	0.1965	32SB09	32SB09(0-2)	SEMIVOLATILES	REG	4-Jun-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.375	U	0.1875	32SB10	32SB10(0-2)	SEMIVOLATILES	REG	4-Jun-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.407	U	0.2035	32SB11	32SB11(0-2)	SEMIVOLATILES	REG	26-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.363	U	0.1815	32SB12	32SB12(0-2)	SEMIVOLATILES	REG	25-May-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.379	U	0.1895	32SB13	32SB13(0-2)	SEMIVOLATILES	REG	3-Jun-93	0	2	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.493	U	0.2465	32SD05	32SD05(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.465	U	0.2325	32SD06	32SD06(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.524	U	0.262	32SD07	32SD07(0.5)	SEMIVOLATILES	REG	30-Apr-93	0	0.5	-0.099	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.4	U	0.2	32SS03	32SS03(0-0.5)	SEMIVOLATILES	REG	26-Jul-98	0	0.5	0.4	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.361	U	0.1805	35SUMP022-SB01	35-SMP22-SB01-01	SEMIVOLATILES	REG	13-Sep-06	0.5	0.5	0.18	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.124	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.252	U	0.126	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.126	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.257	U	0.1285	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.188	U	0.094	35SUMP036-SB01	35-SMP36-SB01-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0939	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.171	U	0.0855	35SUMP036-SB02	35-SMP36-SB02-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0857	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.182	U	0.091	35SUMP038-SB01	35-SMP38-SB01-01	SEMIVOLATILES	REG	12-Sep-06	0.5	0.5	0.0908	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.181	U	0.0905	35SUMP038-SB01	35-SMP38-SB01-02	SEMIVOLATILES	REG	12-Sep-06	2.5	3	0.0905	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.378	U	0.189	35SUMP052-SB01	35-SMP052-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.189	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.174	U	0.087	35SUMP052-SB01	35-SMP052-SB01-02	SEMIVOLATILES	REG	19-Sep-06	3	3	0.0871	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	2.15	U	1.075	35SUMP056-SB01	35-SMP056-SB01-01	SEMIVOLATILES	REG	22-Sep-06	0.5	0.5	1.07	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.214	U	0.107	35SUMP056-SB01	35-SMP056-SB01-02	SEMIVOLATILES	REG	22-Sep-06	3	3	0.107	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.895	U	0.4475	35SUMP064-SB01	35-SMP064-SB01-01	SEMIVOLATILES	REG	20-Sep-06	1	1	0.447	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.186	U	0.093	35SUMP074-SB01	35-SMP074-SB01-01	SEMIVOLATILES	REG	21-Sep-06	0.5	0.5	0.0931	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.918	U	0.459	35SUMP074-SB02	35-SMP074-SB02-01	SEMIVOLATILES	REG	21-Sep-06	0.5	0.5	0.459	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.908	U	0.454	35SUMP088-SB01	35-SMP088-SB01-01	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.454	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.923	U	0.4615	35SUMP088-SB02	35-SMP088-SB02-01	SEMIVOLATILES	REG	20-Sep-06	0.5	0.5	0.461	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.252	U	0.126	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.126	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.255	U	0.1275	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.127	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.249	U	0.1245	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.124	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.126	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.252	U	0.126	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.126	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.182	U	0.091	35SUMP121-SB01	35-SMP121-SB01-01	SEMIVOLATILES	REG	14-Sep-06	0.5	0.5	0.0912	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1		1.1	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	Y	=	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.13	U	0.065	49SB34	49SB34(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.639	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	49SB34	49SB34(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.547	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	49SB35	49SB35(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.624	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.125	U	0.0625	49SB35	AVG-49SB35(0-0.5)	SEMIVOLATILES	AVG	7-Dec-00	0	0.5	0.633	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	49SB36	49SB36(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.62	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	49SB36	49SB36(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.603	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.181	U	0.0905	55SB02	55SB02-1-2	SEMIVOLATILES	REG	27-Sep-06	1	2	0.0903	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.19	U	0.095	55SB03	55-SB03-1-2	SEMIVOLATILES	REG	27-Sep-06	1	2	0.095	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.195	U	0.0975	55SB03	55-SB03-3.0	SEMIVOLATILES	REG	27-Sep-06	3	3	0.0974	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.177	U	0.0885	55SB05	55-SB05-1-2	SEMIVOLATILES	REG	28-Sep-06	1	2	0.0884	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.178	U	0.089	55SB05	55-SB05-2.5	SEMIVOLATILES	REG	28-Sep-06	2.5	2.5	0.089	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.249	U	0.1245	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.124	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.126	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.918	U	0.459	64SB01	64SB01-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.459	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	64SB02	64SB02-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.19	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.918	U	0.459	64SB03	64SB03-01	SEMIVOLATILES	REG	29-Aug-06	0.5	1	0.459	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	67SB01	67SB01(0-0.5)	SEMIVOLATILES	REG	14-Dec-00	0	0.5	0.571	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	67SB01	67SB01(1-3)	SEMIVOLATILES	REG	6-Dec-00	1	3	0.571	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.28	U	0.14	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.459	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.11	U	0.055	67SB02	67SB02(1-2)	SEMIVOLATILES	REG	6-Dec-00	1	2	0.557	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	67SB03	67SB03(0-0.5)	SEMIVOLATILES	REG	7-Dec-00	0	0.5	0.583	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.12	U	0.06	67SB03	67SB03(1-3)	SEMIVOLATILES	REG	7-Dec-00	1	3	0.588	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	1.82	U	0.91	68SB01	68SB01-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.909	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.194	U	0.097	68SB01	68SB01-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0972	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.917	U	0.4585	68SB02	68SB02-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.459	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.188	U	0.094	68SB02	68SB02-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0939	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.187	U	0.0935	68SB03	68SB03-01	SEMIVOLATILES	REG	30-Aug-06	0	0.5	0.0935	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.186	U	0.093	68SB03	68SB03-02	SEMIVOLATILES	REG	30-Aug-06	0.5	4	0.0932	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0582	N	U	CAPE 2006
Nitrobenzene	98-95-3	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0582	N	U	CAPE 2006
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.202	U	0.101	FWS-016	C-SS-016	SEMIVOLATILES	REG	27-Aug-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.3	U	0.15	FWS-021	C-SS-021	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.292	U	0.146	FWS-022	C-SS-022	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.352	U	0.176	FWS-025	C-SS-025	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.302	U	0.151	FWS-026	C-SS-026	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.328	U	0.164	FWS-029	C-SS-029	SEMIVOLATILES	REG	2-Oct-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.258	U	0.129	FWS-035	C-SS-035	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.306	U	0.153	FWS-036	C-SS-036	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.258	U	0.129	FWS-038	C-SS-038	SEMIVOLATILES	REG	25-Sep-02	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0319	U	0.01595	FWS-112	CLNWR112	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0303	U	0.01515	FWS-113	AVG-CLNWR113	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0303	U	0.01515	FWS-114	CLNWR114	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0292	U	0.0146	FWS-115	CLNWR115	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0299	U	0.01495	FWS-116	CLNWR116	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0313	U	0.01565	FWS-117	CLNWR117	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0273	U	0.01365	FWS-121	CLNWR121	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0398	U	0.0199	FWS-122	CLNWR122	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0383	U	0.01915	FWS-125	CLNWR125	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0291	U	0.01455	FWS-126	CLNWR126	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0316	U	0.0158	FWS-128	CLNWR128	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0342	U	0.0171	FWS-129	CLNWR129	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0299	U	0.01495	FWS-130	CLNWR130	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.031	U	0.0155	FWS-131	AVG-CLNWR131	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0313	U	0.01565	FWS-132	CLNWR132	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0333	U	0.01665	FWS-133	CLNWR133	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0326	U	0.0163	FWS-134	CLNWR134	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.02815	U	0.014075	FWS-160	AVG-CLNWR160	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0273	U	0.01365	FWS-161	CLNWR161	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0306	U	0.0153	FWS-164	CLNWR164	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0402	U	0.0201	FWS-165	CLNWR165	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03	U	0.015	FWS-166	CLNWR166	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.036	U	0.018	FWS-167	CLNWR167	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0313	U	0.01565	FWS-168	CLNWR168	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0302	U	0.0151	FWS-176	CLNWR176	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0328	U	0.0164	FWS-177	CLNWR177	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0261	U	0.01305	FWS-178	CLNWR178	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0335	U	0.01675	FWS-189	CLNWR189	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0334	U	0.0167	FWS-190	CLNWR190	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0319	U	0.01595	FWS-191	CLNWR191	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0308	U	0.0154	FWS-192	CLNWR192	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0321	U	0.01605	FWS-193	CLNWR193	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03155	U	0.015775	FWS-194	AVG-CLNWR194	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03	U	0.015	FWS-195	CLNWR195	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0311	U	0.01555	FWS-196	CLNWR196	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0298	U	0.0149	FWS-220	CLNWR220	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0289	U	0.01445	FWS-221	CLNWR221	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0325	U	0.01625	FWS-222	CLNWR222	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0397	U	0.01985	FWS-229	CLNWR229	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0304	U	0.0152	FWS-230	CLNWR230	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.03275	U	0.016375	FWS-231	AVG-CLNWR231	SEMIVOLATILES	AVG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0334	U	0.0167	FWS-233	CLNWR233	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0315	U	0.01575	FWS-234	CLNWR234	SEMIVOLATILES	REG	9-Sep-03	0	0.5		N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP

Table A-2
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BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	1.7	U	0.85	LAP-023	LAP-023A	SEMIVOLATILES	REG	10-Jul-00	0	0.5		N	U	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LAP-025	LAP-025A	SEMIVOLATILES	REG	10-Jul-00	0	0.5		N	U	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL063-01	LH-DL063-01	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL064-01	LH-DL064-01	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL065-01	AVG-LH-DL065-01	SEMIVOLATILES	AVG	5-Aug-93	1.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL072-01	LH-DL072-01	SEMIVOLATILES	REG	4-Aug-93	2	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL27-01	LH-DL27-01	SEMIVOLATILES	REG	24-Jun-93	1.5	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL29-01	LH-DL29-01	SEMIVOLATILES	REG	25-Jun-93	2	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL44-01	LH-DL44-01	SEMIVOLATILES	REG	10-Jul-93	2.1	2.8	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL45-01	LH-DL45-01	SEMIVOLATILES	REG	10-Jul-93	2.3	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL47-01	LH-DL47-01	SEMIVOLATILES	REG	9-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL50-01	LH-DL50-01	SEMIVOLATILES	REG	11-Jul-93	2	2.9	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL52-01	LH-DL52-01	SEMIVOLATILES	REG	3-Aug-93	1.3	1.7	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL53-01	LH-DL53-01	SEMIVOLATILES	REG	13-Jul-93	0	0	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.602	U	0.301	LH-DL58-01	LH-DL58-01	SEMIVOLATILES	REG	26-Jun-93	2.1	2.9	0.602	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL61-01	LH-DL61-01	SEMIVOLATILES	REG	6-Aug-93	2	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.575	U	0.2875	LH-DL69-01	LH-DL69-01	SEMIVOLATILES	REG	26-Jun-93	2.5	3	0.575	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL71-01	LH-DL71-01	SEMIVOLATILES	REG	24-Jul-93	2	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.649	U	0.3245	LH-DL723-01	LH-DL723-01	SEMIVOLATILES	REG	26-Jun-93	1	2	0.649	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.581	U	0.2905	LH-DL73-01	LH-DL73-01	SEMIVOLATILES	REG	26-Jun-93	2	2.7	0.581	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.617	U	0.3085	LH-DL74-01	LH-DL74-01	SEMIVOLATILES	REG	26-Jun-93	2	2.7	0.617	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.61	U	0.305	LH-DL75-01	LH-DL75-01	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.61	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.595	U	0.2975	LH-DL76-01	LH-DL76-01	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.595	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.61	U	0.305	LH-DL77-01	LH-DL77-01	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.61	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.61	U	0.305	LH-DL85-01	LH-DL85-01	SEMIVOLATILES	REG	26-Jun-93	2.5	3	0.61	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL91	LH-DL91	SEMIVOLATILES	REG	23-Jul-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL92-01	LH-DL92-01	SEMIVOLATILES	REG	23-Jul-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-DL93-01	LH-DL93-01	SEMIVOLATILES	REG	27-Jul-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.635	U	0.3175	LH-DL95-01	LH-DL95-01	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.635	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S01-01	LH-S01-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S01-02	LH-S01-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S017-01	AVG-LH-S017-01_1	SEMIVOLATILES	AVG	8-Aug-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S017-01	LH-S017-01_2	SEMIVOLATILES	REG	8-Aug-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S017-02	LH-S017-02_1	SEMIVOLATILES	REG	8-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S017-02	LH-S017-02_2	SEMIVOLATILES	REG	8-Aug-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S018-01	LH-S018-01_1	SEMIVOLATILES	REG	8-Aug-93	0.5	1.1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S018-01	LH-S018-01_2	SEMIVOLATILES	REG	8-Aug-93	1.1	1.6	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S02-01	LH-S02-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S02-02	LH-S02-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S021-01	AVG-LH-S021-01_1	SEMIVOLATILES	AVG	6-Aug-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S021-02	LH-S021-02_1	SEMIVOLATILES	REG	6-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S021-02	LH-S021-02_2	SEMIVOLATILES	REG	6-Aug-93	2	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S025-01	AVG-LH-S025-01_1	SEMIVOLATILES	AVG	6-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S025-02	LH-S025-02_1	SEMIVOLATILES	REG	6-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S025-02	LH-S025-02_2	SEMIVOLATILES	REG	6-Aug-93	1.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S026-01	AVG-LH-S026-01_1	SEMIVOLATILES	AVG	8-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S026-02	LH-S026-02_1	SEMIVOLATILES	REG	8-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S026-02	LH-S026-02_2	SEMIVOLATILES	REG	8-Aug-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S03-01	LH-S03-01_1	SEMIVOLATILES	REG	10-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S03-02	LH-S03-02_1	SEMIVOLATILES	REG	10-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S04-01	LH-S04-01_1	SEMIVOLATILES	REG	9-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S04-02	LH-S04-02_1	SEMIVOLATILES	REG	9-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S05-01	LH-S05-01_1	SEMIVOLATILES	REG	9-Jul-93	0	2	0.33	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S05-02	LH-S05-02_1	SEMIVOLATILES	REG	9-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S06-01	AVG-LH-S06-01_1	SEMIVOLATILES	AVG	9-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S06-02	LH-S06-02_1	SEMIVOLATILES	REG	9-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S062-01	AVG-LH-S062-01_1	SEMIVOLATILES	AVG	5-Aug-93	0.5	1.2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S062-01	LH-S062-01_2	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_1	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_2	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S063-01	LH-S063-01_3	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S064-01	LH-S064-01_1	SEMIVOLATILES	REG	5-Aug-93	1.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S064-01	LH-S064-01_3	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S064-02	LH-S064-02_1	SEMIVOLATILES	REG	5-Aug-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S064-02	LH-S064-02_2	SEMIVOLATILES	REG	5-Aug-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S065-01	LH-S065-01_1	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S065-01	LH-S065-01_2	SEMIVOLATILES	REG	5-Aug-93	2	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S065-02	LH-S065-02_1	SEMIVOLATILES	REG	5-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S07-01	LH-S07-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S07-02	LH-S07-02_1	SEMIVOLATILES	REG	25-Jun-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S07-02	LH-S07-02_2	SEMIVOLATILES	REG	25-Jun-93	2	4	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S072-01	LH-S072-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S072-02	LH-S072-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S08-01	LH-S08-01_1	SEMIVOLATILES	REG	12-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S08-02	LH-S08-02_1	SEMIVOLATILES	REG	12-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.572	U	0.286	LH-S09-01	AVG-LH-S09-01_1	SEMIVOLATILES	AVG	26-Jun-93	0.5	1.5	0.588	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.575	U	0.2875	LH-S09-02	LH-S09-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.575	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.5775	U	0.28875	LH-S100-01	AVG-LH-S100-01_1	SEMIVOLATILES	AVG	26-Jun-93	0.5	1.5	0.58	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.617	U	0.3085	LH-S100-01	LH-S100-01_2	SEMIVOLATILES	REG	26-Jun-93	1.5	3	0.617	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S10-01	LH-S10-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S10-02	LH-S10-02_1	SEMIVOLATILES	REG	11-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.61	U	0.305	LH-S101-01	LH-S101-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.61	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S102-01	AVG-LH-S102-01_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S102-02	LH-S102-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S103-01	LH-S103-01_1	SEMIVOLATILES	REG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S103-02	LH-S103-02_1	SEMIVOLATILES	REG	25-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S104-01	LH-S104-01_1	SEMIVOLATILES	REG	3-Aug-93	1.5	2.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S104-02	AVG-LH-S104-02_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S105-01	LH-S105-01_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S105-02	LH-S105-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.625	U	0.3125	LH-S107-01	LH-S107-01 QC	SEMIVOLATILES	FD (NO REG FOR SVOC)	26-Jun-93	0.5	1.5	0.625	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.633	U	0.3165	LH-S107-01	LH-S107-01_2	SEMIVOLATILES	REG	26-Jun-93	1	1.5	0.633	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.575	U	0.2875	LH-S107-01	LH-S107-01_3	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.575	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.549	U	0.2745	LH-S108-01	LH-S108-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.549	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.575	U	0.2875	LH-S108-01	LH-S108-01_2	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.575	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.625	U	0.3125	LH-S109-01	LH-S109-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.625	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.617	U	0.3085	LH-S109-01	LH-S109-01_2	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.617	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S110-01	LH-S110-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S11-01	LH-S11-01_1	SEMIVOLATILES	REG	25-Jun-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S11-02	LH-S11-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S111-01	LH-S111-01_1	SEMIVOLATILES	REG	8-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S111-01	LH-S111-01_2	SEMIVOLATILES	REG	8-Jul-93	2	4	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S112-01	LH-S112-01_1	SEMIVOLATILES	REG	8-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S113-01	LH-S113-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S117-01	LH-S117-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S118-01	LH-S118-01_1	SEMIVOLATILES	REG	8-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S118-01	LH-S118-01_2	SEMIVOLATILES	REG	8-Jul-93	2	4	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S118-02	LH-S118-02_1	SEMIVOLATILES	REG	8-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S118-02	LH-S118-02_2	SEMIVOLATILES	REG	8-Jul-93	2	4	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S119-01	AVG-LH-S119-01_1	SEMIVOLATILES	AVG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S119-02	LH-S119-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S120-01	LH-S120-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S120-02	LH-S120-02 _1	SEMIVOLATILES	REG	4-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S12-01	LH-S12-01_1	SEMIVOLATILES	REG	11-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S12-02	LH-S12-02_1	SEMIVOLATILES	REG	11-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S121-01	LH-S121-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S121-02	LH-S121-02_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S122-01	AVG-LH-S122-01_1	SEMIVOLATILES	AVG	3-Aug-93	0.5	1.2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S122-02	LH-S122-02_1	SEMIVOLATILES	REG	3-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.578	U	0.289	LH-S123-01	LH-S123-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.578	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S13-01	AVG-LH-S13-01_1	SEMIVOLATILES	AVG	10-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S13-02	LH-S13-02_1	SEMIVOLATILES	REG	10-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S14-01	LH-S14-01_1	SEMIVOLATILES	REG	8-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S14-02	LH-S14-02_1	SEMIVOLATILES	REG	8-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S15-01	LH-S15-01_1	SEMIVOLATILES	REG	8-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LH-S15-02	LH-S15-02_1	SEMIVOLATILES	REG	8-Jul-93	0.5	1.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	3.3	UD	1.65	LH-S16-01	LH-S16-01_1	SEMIVOLATILES	REG	8-Jul-93	0.5	1.5	3.3	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	3.3	UD	1.65	LH-S19-01	LH-S19-01	SEMIVOLATILES	REG	6-Aug-93	1	1.5	3.3	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S19-01	LH-S19-01_1	SEMIVOLATILES	REG	6-Aug-93	1.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S19-02	LH-S19-02_1	SEMIVOLATILES	REG	6-Aug-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S20-01	LH-S20-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S20-01	LH-S20-01_2	SEMIVOLATILES	REG	25-Jun-93	2	4	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S20-02	LH-S20-02_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S22-01	LH-S22-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2.5	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S22-02	LH-S22-02_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2.5	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S23-01	AVG-LH-S23-01_1	SEMIVOLATILES	AVG	25-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S23-02	LH-S23-02_1	SEMIVOLATILES	REG	25-Jul-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S24-01	LH-S24-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S24-01	LH-S24-01_2	SEMIVOLATILES	REG	25-Jun-93	2	4	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S27-01	LH-S27-01_1	SEMIVOLATILES	REG	24-Jun-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S27-02	LH-S27-02 _1	SEMIVOLATILES	REG	24-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S29-01	LH-S29-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2.5	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S29-02	LH-S29-02_1	SEMIVOLATILES	REG	25-Jun-93	0	2	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S29-02	LH-S29-02_2	SEMIVOLATILES	REG	25-Jun-93	2	4	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S30-01	LH-S30-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2.5	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S31-01	LH-S31-01_1	SEMIVOLATILES	REG	21-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.15	U	0.075	LH-S32-01	LH-S32-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2.5	0.15	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S33-01	LH-S33-01_1	SEMIVOLATILES	REG	21-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S34-01	LH-S34-01_2	SEMIVOLATILES	REG	10-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S35-01	LH-S35-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S37-01	LH-S37-01_1	SEMIVOLATILES	REG	25-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S38-01	LH-S38-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.61	U	0.305	LH-S39-01	AVG-LH-S39-01_1	SEMIVOLATILES	AVG	26-Jun-93	0.5	1.5	0.61	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S40-01	LH-S40-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S41-01	LH-S41-01_1	SEMIVOLATILES	REG	25-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S42-01	AVG-LH-S42-01_1	SEMIVOLATILES	AVG	25-Jun-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S42-01	LH-S42-01_2	SEMIVOLATILES	REG	25-Jun-93	2.5	3.3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.549	U	0.2745	LH-S43-01	LH-S43-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1	0.549	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.575	U	0.2875	LH-S43-01	LH-S43-01_2	SEMIVOLATILES	REG	26-Jun-93	1.5	2	0.575	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S44-01	LH-S44-01_1	SEMIVOLATILES	REG	10-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S44-02	LH-S44-02_1	SEMIVOLATILES	REG	11-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S45-01	LH-S45-01_1	SEMIVOLATILES	REG	10-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S47-01	LH-S47-01_1	SEMIVOLATILES	REG	9-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S47-01	LH-S47-01_2	SEMIVOLATILES	REG	9-Jul-93	2.2	3.2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S48-01	LH-S48-01_1	SEMIVOLATILES	REG	27-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S48-02	LH-S48-02	SEMIVOLATILES	REG	27-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S49-01	AVG-LH-S49-01_1	SEMIVOLATILES	AVG	9-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S50-01	LH-S50-01_1	SEMIVOLATILES	REG	28-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S50-01	LH-S50-01_2	SEMIVOLATILES	REG	27-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S51-01	AVG-LH-S51-01_1	SEMIVOLATILES	AVG	11-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S52-01	LH-S52-01_1	SEMIVOLATILES	REG	3-Aug-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S52-01	LH-S52-01_2	SEMIVOLATILES	REG	3-Aug-93	1.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S53-01	LH-S53-01_1	SEMIVOLATILES	REG	13-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S53-02	LH-S53-02_1	SEMIVOLATILES	REG	13-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S54-01	LH-S54-01_1	SEMIVOLATILES	REG	12-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S55-01	AVG-LH-S55-01_1	SEMIVOLATILES	AVG	12-Jul-93	0	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S56-01	LH-S56-01_1	SEMIVOLATILES	REG	5-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S57-01	LH-S57-01_1	SEMIVOLATILES	REG	22-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S57-01	LH-S57-01_2	SEMIVOLATILES	REG	22-Jul-93	2	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S57-02	LH-S57-02_1	SEMIVOLATILES	REG	22-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S57-02	LH-S57-02_2	SEMIVOLATILES	REG	22-Jul-93	2	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.579	U	0.2895	LH-S58-01	LH-S58-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.579	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S59-01	LH-S59-01_1	SEMIVOLATILES	REG	21-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S59-02	LH-S59-02_1	SEMIVOLATILES	REG	21-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S60-01	LH-S60-01_1	SEMIVOLATILES	REG	22-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S60-02	LH-S60-02_2	SEMIVOLATILES	REG	22-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S60-02	LH-S60-02_3	SEMIVOLATILES	REG	22-Jul-93	2.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S61-01	LH-S61-01_1	SEMIVOLATILES	REG	6-Aug-93	0.5	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S61-02	LH-S61-02_1	SEMIVOLATILES	REG	6-Aug-93	1	3	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S66-01	AVG-LH-S66-01_1	SEMIVOLATILES	AVG	5-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S66-02	LH-S66-02_1	SEMIVOLATILES	REG	5-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S67-01	LH-S67-01_1	SEMIVOLATILES	REG	6-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S68-01	AVG-LH-S68-01_1	SEMIVOLATILES	AVG	6-Aug-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S68-02	AVG-LH-S68-02	SEMIVOLATILES	AVG	6-Aug-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.568	U	0.284	LH-S69-01	AVG-LH-S69-01_1	SEMIVOLATILES	AVG	26-Jun-93	0.5	1.5	0.568	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.581	U	0.2905	LH-S69-02	LH-S69-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.581	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S70-01	LH-S70-01_1	SEMIVOLATILES	REG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S70-02	LH-S70-02_1	SEMIVOLATILES	REG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S71-01	LH-S71-01_1	SEMIVOLATILES	REG	24-Jul-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S71-02	LH-S71-02_1	SEMIVOLATILES	REG	24-Jul-93	1	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	1.351	U	0.6755	LH-S723-01	LH-S723-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	1.351	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.617	U	0.3085	LH-S723-02	LH-S723-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.617	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.568	U	0.284	LH-S73-01	LH-S73-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.568	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.581	U	0.2905	LH-S75-01	LH-S75-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.581	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.602	U	0.301	LH-S75-02	LH-S75-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.602	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.575	U	0.2875	LH-S76-01	LH-S76-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.575	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.602	U	0.301	LH-S76-01	LH-S76-01_2	SEMIVOLATILES	REG	26-Jun-93	2	2.5	0.602	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.595	U	0.2975	LH-S76-02	LH-S76-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.595	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.5815	U	0.29075	LH-S77-01	AVG-LH-S77-01_1	SEMIVOLATILES	AVG	26-Jun-93	0.5	1.5	0.588	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.595	U	0.2975	LH-S77-01	LH-S77-01_2	SEMIVOLATILES	REG	26-Jun-93	1.5	3	0.595	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.568	U	0.284	LH-S77-02	LH-S77-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.568	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.61	U	0.305	LH-S77-02	LH-S77-02_2	SEMIVOLATILES	REG	26-Jun-93	2.5	3	0.61	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S78-01	LH-S78-01_1	SEMIVOLATILES	REG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S79-01	LH-S79-01_1	SEMIVOLATILES	REG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S80-01	AVG-LH-S80-01_1	SEMIVOLATILES	AVG	24-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S81-01	LH-S81-01_1	SEMIVOLATILES	REG	23-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S81-02	LH-S81-02_1	SEMIVOLATILES	REG	23-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S82-01	LH-S82-01_1	SEMIVOLATILES	REG	23-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S83-01	LH-S83-01_1	SEMIVOLATILES	REG	23-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S83-02	AVG-LH-S83-02_1	SEMIVOLATILES	AVG	23-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S84-01	AVG-LH-S84-01_1	SEMIVOLATILES	AVG	21-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S86-01	AVG-LH-S86-01_1	SEMIVOLATILES	AVG	27-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S86-02	LH-S86-02_1	SEMIVOLATILES	REG	27-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S87-01	LH-S87-01_1	SEMIVOLATILES	REG	22-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.595	U	0.2975	LH-S87-01	LH-S87-01_2	SEMIVOLATILES	REG	26-Jun-93	2.5	3	0.595	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S88-01	AVG-LH-S88-01_1	SEMIVOLATILES	AVG	22-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S88-02	LH-S88-02_1	SEMIVOLATILES	REG	22-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S89-01	LH-S89-01_1	SEMIVOLATILES	REG	21-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S89-02	LH-S89-02_1	SEMIVOLATILES	REG	21-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S90-01	LH-S90-01_1	SEMIVOLATILES	REG	21-Jul-93	0.5	1.5	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S90-02	LH-S90-02_1	SEMIVOLATILES	REG	21-Jul-93	0.5	2	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S91-01	LH-S91-01_1	SEMIVOLATILES	REG	23-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S91-02	LH-S91-02_1	SEMIVOLATILES	REG	24-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S92-01	AVG-LH-S92-01_1	SEMIVOLATILES	AVG	23-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S92-02	LH-S92-02_1	SEMIVOLATILES	REG	23-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S93-01	LH-S93-01_1	SEMIVOLATILES	REG	24-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S93-02	LH-S93-02 _1	SEMIVOLATILES	REG	24-Jul-93	0.5	1	0.33	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.614	U	0.307	LH-S94-01	LH-S94-01_1	SEMIVOLATILES	REG	20-Aug-93	0.5	1.5	0.614	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.634	U	0.317	LH-S95-01	AVG-LH-S95-01_1	SEMIVOLATILES	AVG	26-Jun-93	0.5	1.5	0.658	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.602	U	0.301	LH-S95-02	LH-S95-02_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.602	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.564	U	0.282	LH-S96-01	LH-S96-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.564	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.594	U	0.297	LH-S96-01	LH-S96-01_2	SEMIVOLATILES	REG	26-Jun-93	2	2.8	0.594	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.577	U	0.2885	LH-S97-01	LH-S97-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.577	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.573	U	0.2865	LH-S98-01	LH-S98-01_1	SEMIVOLATILES	REG	26-Jun-93	0.5	1.5	0.573	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.596	U	0.298	LH-S98-01	LH-S98-01_2	SEMIVOLATILES	REG	26-Jun-93	1.5	3	0.596	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.5855	U	0.29275	LH-S99-01	AVG-LH-S99-01_1	SEMIVOLATILES	AVG	26-Jun-93	0.5	1.5	0.575	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.648	U	0.324	LH-S99-01	LH-S99-01_2	SEMIVOLATILES	REG	26-Jun-93	2	2.8	0.648	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.5	U	0.25	LHSMW01	LHS-MW1	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.5	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW02	LHS-MW2	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW03	LHS-MW3	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.49	U	0.245	LHSMW04	LHS-MW4	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.49	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LHSMW05	LHS-MW5	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW06	LHS-MW6	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LHSMW07	LHS-MW7	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW08	LHS-MW8	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW09	LHS-MW9	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LHSMW10	LHS-MW10	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.39	U	0.195	LHSMW11	AVG-LHS-MW11	SEMIVOLATILES	AVG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LHSMW12	LHS-MW12	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW13	LHS-MW13	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW14	LHS-MW14	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LHSMW15	LHS-MW15	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW16	LHS-MW16	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW17	LHS-MW17	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW18	LHS-MW18	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW19	LHS-MW19	SEMIVOLATILES	REG	30-Sep-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.365	U	0.1825	LHSMW20	AVG-LHS-MW20	SEMIVOLATILES	AVG	3-Oct-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW21	LHS-MW21	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW22	LHS-MW22	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW23	LHS-MW23	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LHSMW24	LHS-MW24	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW25	LHS-MW25	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW26	LHS-MW26	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW27	LHS-MW27	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW28	LHS-MW28	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW29	LHS-MW29	SEMIVOLATILES	REG	3-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW30	AVG-LHS-MW30	SEMIVOLATILES	AVG	3-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW31	LHS-MW31	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW32	LHS-MW32	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW33	LHS-MW33	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LHSMW34	LHS-MW34	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.42	U	0.21	LHSMW35	LHS-MW35	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.42	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LHSMW36	LHS-MW36	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW37	LHS-MW37	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW38	LHS-MW38	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW39	LHS-MW39	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW40	AVG-LHS-MW40	SEMIVOLATILES	AVG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW41	LHS-MW41	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW42	LHS-MW42	SEMIVOLATILES	REG	4-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW43	LHS-MW43	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW44	LHS-MW44	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW45	LHS-MW45	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LHSMW46	LHS-MW46	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW47	LHS-MW47	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW48	LHS-MW48	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW49	LHS-MW49	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LHSMW50	AVG-LHS-MW50	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LHSMW51	LHS-MW51	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW52	LHS-MW52	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW53	LHS-MW53	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.4	U	0.2	LHSMW54	LHS-MW54	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.4	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW55	LHS-MW55	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW56	LHS-MW56	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LHSMW57	LHS-MW57	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.42	U	0.21	LHSMW58	LHS-MW58	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.42	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.38	U	0.19	LHSMW59	LHS-MW59	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.375	U	0.1875	LHSMW60	AVG-LHS-MW60	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.38	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW61	LHS-MW61	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.4	U	0.2	LHSMW62	LHS-MW62	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.4	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW63	LHS-MW63	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.39	U	0.195	LHSMW64	LHS-MW64	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.39	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW65	LHS-MW65	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW66	LHS-MW66	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.37	U	0.185	LHSMW67	LHS-MW67	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.37	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW68	LHS-MW68	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.35	U	0.175	LHSMW69	LHS-MW69	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.35	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.36	U	0.18	LHSMW70	AVG-LHS-MW70	SEMIVOLATILES	AVG	5-Oct-94	0	0.5	0.36	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.34	U	0.17	LHSMW71	LHS-MW71	SEMIVOLATILES	REG	5-Oct-94	0	0.5	0.34	N	<	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.255	U	0.1275	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.127	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.126	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.84	U	0.92	WRS011-SB01	WRS011-SB01-01	SEMIVOLATILES	REG	26-Sep-06	0.5	0.5	0.921	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.99	U	0.995	WRS011-SB02	WRS011-SB02-01	SEMIVOLATILES	REG	26-Sep-06	0.5	0.5	0.996	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.7	U	0.85	WRS015-SB01	WRS-015-SB01-01	SEMIVOLATILES	REG	15-Sep-06	0.5	0.5	0.85	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	3.46	U	1.73	WRS015-SB02	WRS-15-SB02-01	SEMIVOLATILES	REG	15-Sep-06	1	1	1.73	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.26	U	0.13	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.13	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.125	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.257	U	0.1285	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.129	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.84	U	0.92	WRS04-SB01	WRS04-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.919	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.82	U	0.91	WRS06-SB01	WRS06-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.912	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.189	U	0.0945	WRS07-SB01	WRS07-SB01-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.0947	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.83	U	0.915	WRS07-SB02	WRS07-SB02-01	SEMIVOLATILES	REG	25-Sep-06	0.5	0.5	0.914	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.18	U	0.09	WRS09-SB01	WRS09-SB01-01	SEMIVOLATILES	REG	15-Sep-06	1	1	0.0899	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	1.74	U	0.87	WRS09-SB02	WRS09-SB02-01	SEMIVOLATILES	REG	15-Sep-06	0.5	0.5	0.871	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.255	U	0.1275	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.127	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.125	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.126	N	U	Post BERA
RDX	121-82-4	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.28	U	0.14	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.922	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.285	U	0.1425	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.952	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.976	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.295	U	0.1475	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.952	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.98	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.3	U	0.15	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.99	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.3	U	0.15	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.985	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.27	U	0.135	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.913	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.995	U	0.4975	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
RDX	121-82-4	mg/kg	0.98	U	0.49	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.098	N	U	Post BERA
RDX	121-82-4	mg/kg	0.966	U	0.483	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0966	N	U	Post BERA
RDX	121-82-4	mg/kg	0.976	U	0.488	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0976	N	U	Post BERA
RDX	121-82-4	mg/kg	0.995	U	0.4975	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.0995	N	U	Post BERA
RDX	121-82-4	mg/kg	0.957	U	0.4785	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.0957	N	U	Post BERA
RDX	121-82-4	mg/kg	0.26	U	0.13	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.438	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.28	U	0.14	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.93	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.27	U	0.135	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.889	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.3	U	0.15	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.99	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.488	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.98	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.275	U	0.1375	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.837	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
RDX	121-82-4	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SS(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.238	U	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS01	29SS01(0-0.5)	EXPLOSIVES	REG	24-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS02	AVG-29SS02(0-0.5)	EXPLOSIVES	AVG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS03	29SS03(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS04	29SS04(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS05	29SS05(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS06	29SS06(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS06	AVG-29SS06(1-3)	EXPLOSIVES	AVG	25-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS07	29SS07(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS07	29SS07(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS08	29SS08(0-0.5)	EXPLOSIVES	REG	25-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	29SS08	29SS08(1-3)	EXPLOSIVES	REG	25-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.24	U	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.25	U	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.24	U	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.23	U	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.21	U	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.22	U	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.21	U	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.19	U	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.2	U	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS01	32SS01(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS01	AVG-32SS01(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS02	32SS02(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS02	32SS02(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS03	32SS03(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS03	32SS03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS04	32SS04(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	32SS04	AVG-32SS04(1-3)	EXPLOSIVES	AVG	26-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.1	U	0.05	35ASB03	35ASB03(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
RDX	121-82-4	mg/kg	0.1	U	0.05	35ASB03	AVG-35ASB03(0-0.5)	EXPLOSIVES	AVG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	35ASB05	35ASB05(0-0.5)	EXPLOSIVES	REG	26-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	35ASB05	35ASB05(1-3)	EXPLOSIVES	REG	26-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	35BSB01	35BSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	35BSB01	AVG-35BSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	35CSB01	35CSB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	35CSB01	AVG-35CSB01(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.995	U	0.4975	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0995	N	U	Post BERA
RDX	121-82-4	mg/kg	0.952	U	0.476	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0952	N	U	Post BERA
RDX	121-82-4	mg/kg	0.971	U	0.4855	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.0971	N	U	Post BERA
RDX	121-82-4	mg/kg	0.995	U	0.4975	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.0995	N	U	Post BERA
RDX	121-82-4	mg/kg	0.99	U	0.495	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.971	U	0.4855	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
RDX	121-82-4	mg/kg	0.98	U	0.49	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.098	N	U	Post BERA
RDX	121-82-4	mg/kg	0.957	U	0.4785	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0957	N	U	Post BERA
RDX	121-82-4	mg/kg	0.966	U	0.483	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.0966	N	U	Post BERA
RDX	121-82-4	mg/kg	0.971	U	0.4855	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0971	N	U	Post BERA
RDX	121-82-4	mg/kg	0.1	U	0.05	46SB01	46SB01(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SB01	46SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SB02	46SB02(0-0.5)	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SB02	46SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SB03	46SB03(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SB03	AVG-46SB03(0-0.5)	EXPLOSIVES	AVG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	47SB01	47SB01(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	47SB01	C-47SB01(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	47SB02	47SB02(1-3)	EXPLOSIVES	REG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	47SB02	C-47SB02(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	47SB03	AVG-47SB03(1-3)	EXPLOSIVES	AVG	27-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	47SB03	C-47SB03(0-0.5)-9807	EXPLOSIVES	REG	27-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	48SB01	48SB01(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	48SB01	AVG-48SB01(1-3)	EXPLOSIVES	AVG	28-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.952	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.27	U	0.135	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.905	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	UJ	0.145	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.488	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.275	U	0.1375	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.877	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.962	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.27	U	0.135	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.905	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	50SB06	50SB06(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	50SB06	AVG-50SB06(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	50SS07	50SS07(0-0.5)	EXPLOSIVES	REG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	1	U	0.5	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.1	N	U	Post BERA
RDX	121-82-4	mg/kg	0.971	U	0.4855	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0971	N	U	Post BERA
RDX	121-82-4	mg/kg	0.99	U	0.495	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.995	U	0.4975	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.0995	N	U	Post BERA
RDX	121-82-4	mg/kg	0.995	U	0.4975	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.0995	N	U	Post BERA
RDX	121-82-4	mg/kg	0.957	U	0.4785	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0957	N	U	Post BERA
RDX	121-82-4	mg/kg	0.966	U	0.483	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.0966	N	U	Post BERA
RDX	121-82-4	mg/kg	0.1	U	0.05	60SB22	60SB22(1-3)	EXPLOSIVES	REG	28-Jul-98	1	3	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	60SB22	AVG-60SB22(0-0.5)	EXPLOSIVES	AVG	28-Jul-98	0	0.5	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.976	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.27	U	0.135	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.889	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.28	U	0.14	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.917	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	UJ	0.145	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	0.98	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.28	U	0.14	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.943	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.29	U	0.145	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.962	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0842	N	U	CAPE 2006
RDX	121-82-4	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0842	N	U	CAPE 2006
RDX	121-82-4	mg/kg	0.1	U	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
RDX	121-82-4	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
RDX	121-82-4	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
RDX	121-82-4	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
RDX	121-82-4	mg/kg	0.98	U	0.49	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.098	N	U	Post BERA
RDX	121-82-4	mg/kg	0.966	U	0.483	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.0966	N	U	Post BERA
RDX	121-82-4	mg/kg	0.995	U	0.4975	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0995	N	U	Post BERA
RDX	121-82-4	mg/kg	1	U	0.5	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.1	N	U	Post BERA
RDX	121-82-4	mg/kg	0.962	U	0.481	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.0962	N	U	Post BERA
RDX	121-82-4	mg/kg	0.99	U	0.495	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.099	N	U	Post BERA
RDX	121-82-4	mg/kg	0.98	U	0.49	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.098	N	U	Post BERA
RDX	121-82-4	mg/kg	0.962	U	0.481	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.0962	N	U	Post BERA
RDX	121-82-4	mg/kg	0.966	U	0.483	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.0966	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	01ASB02R	01ASB02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	01ASB02R	01ASB02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0986	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.239	U	0.1195	01ASB04R	01ASB04R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0954	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.228	U	0.114	01ASB04R	01ASB04R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.238	U	0.119	01SB23R	01SB23R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.237	U	0.1185	01SB23R	01SB23R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.095	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.251	U	0.1255	01SB28R	01SB28R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	01SB28R	01SB28R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	01SD09R	01SD09R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0989	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.245	U	0.1225	01SD09R	01SD09R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.18	U	0.09	04SB03	04SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.829	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	04SB03	AVG-04SB03(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.857	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	04SB04	04SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.878	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.195	U	0.0975	04SB04	AVG-04SB04(0-0.5)	EXPLOSIVES	AVG	14-Dec-00	0	0.5	0.857	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	04SB05	04SB05(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.882	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	04SB05	04SB05(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.891	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	04SB06	04SB06(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.887	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.18	U	0.09	04SB06	04SB06(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.822	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	06SB01	06SB01-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.199	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.637	U	0.3185	06SB01	06SB01-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.196	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.628	U	0.314	06SB02	06SB02-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.193	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.634	U	0.317	06SB02	06SB02-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.195	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	06SB03	06SB03-01	EXPLOSIVES	REG	29-Aug-06	0	0	0.199	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.622	U	0.311	06SB03	06SB03-02	EXPLOSIVES	REG	29-Aug-06	0	0	0.191	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.17	U	0.085	08SB01	08SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.595	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	08SB03	08SB03(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.837	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.18	U	0.09	08SB03	08SB03(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.8	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	08SB04	08SB04(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.891	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	08SB04	08SB04(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.663	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	08SB05	08SB05(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.882	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.185	U	0.0925	08SB05	AVG-08SB05(1-3)	EXPLOSIVES	AVG	7-Dec-00	1	3	0.753	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	29SB05R	29SB05R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	29SB05R	29SB05R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0941	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	29SB07R	29SB07R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0917	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.228	U	0.114	29SB07R	29SB07R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0913	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	29SB08R	29SB08R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0988	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.234	U	0.117	29SB08R	29SB08R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	29SB09R	29SB09R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0942	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.238	UJ	0.119	29SB09R	29SB09R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0951	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	UU	0.1175	29SB11R	29SB11R-SB(.5-3)29SB11R-SB(.5-3)FD	EXPLOSIVES	AVG	22-Oct-13	0.5	3	0.09385	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	29SB11R	29SB11R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0988	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.234	U	0.117	29SB12R	29SB12R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	29SB12R	29SB12R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.236	U	0.118	29SB13R	29SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0943	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.249	U	0.1245	29SB13R	29SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0994	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.228	U	0.114	29SB14R	29SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0911	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	29SB14R	29SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	29SB15R	29SB15R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.236	U	0.118	29SB15R	29SB15R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	29SD01R	29SD01R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.239	U	0.1195	29SD01R	29SD01R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0954	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.239	U	0.1195	29SD10R	29SD10R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.0957	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.234	U	0.117	29SD10R	29SD10R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0935	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.1	U	0.05	29SD24	C-29SD24-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	29SD26	29SD26	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.227	U	0.1135	29WL02R	29WL02R-SB(.5-3)	EXPLOSIVES	REG	22-Oct-13	0.5	3	0.091	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.248	U	0.124	29WL02R	29WL02R-SS(0-.5)	EXPLOSIVES	REG	22-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.2485	UU	0.12425	32SB03R	32SB03R-SB(.5-3)32SB03R-SB(.5-3)FD	EXPLOSIVES	AVG	23-Oct-13	0.5	3	0.0995	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.252	U	0.126	32SB03R	32SB03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.101	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.25	U	0.125	32SB06R	32SB06R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.1	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	32SB06R	32SB06R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0982	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	32SB13R	32SB13R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	32SB13R	32SB13R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0963	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.24	UJL	0.12	32SB14	L0001-32SB14	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.251	U	0.1255	32SB14R	32SB14R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	32SB14R	32SB14R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	UJL	0.115	32SB15	L0001-32SB15	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.25	UJL	0.125	32SB16	L0001-32SB16	EXPLOSIVES	REG	16-Aug-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.24	UJL	0.12	32SB17	L0001-32SB17	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.23	UJL	0.115	32SB18	L0001-32SB18	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.21	UJL	0.105	32SB19	L0001-32SB19	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.22	UJL	0.11	32SB20	L0001-32SB20	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Tetryl	479-45-8	mg/kg	0.21	UJL	0.105	32SB21	L0001-32SB21	EXPLOSIVES	REG	17-Aug-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.19	UJL	0.095	32SB22	L0001-32SB22	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.2	UJL	0.1	32SB23	L0001-32SB23	EXPLOSIVES	REG	8-Sep-04	0	1	-0.099	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.245	U	0.1225	32SD06R	32SD06R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.098	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	UU	0.121	32SD06R	32SD06R-SS(0-.5)32SD06R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.0967	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.1	U	0.05	32SD17	AVG-32SD17-981008	EXPLOSIVES	AVG	8-Oct-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	32SD18	32SD18-981008	EXPLOSIVES	REG	8-Oct-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.234	U	0.117	32SS03R	32SS03R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0936	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	32SS03R	32SS03R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0969	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.252	U	0.126	32SS04R	32SS04R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	32SS04R	32SS04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.248	U	0.124	32WL01R	32WL01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	32WL01R	32WL01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	35SUMP017-SB01	35-SMP17-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.199	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.619	U	0.3095	35SUMP034-SB01	35-SMP34-SB01-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.19	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.631	U	0.3155	35SUMP034-SB02	35-SMP34-SB02-01	EXPLOSIVES	REG	11-Sep-06	0	0.5	0.194	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	35SUMP035-SB01	35-SMP35-SB01-01	EXPLOSIVES	REG	12-Sep-06	0.5	0.5	0.199	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.644	U	0.322	35SUMP035-SB02	35-SMP35-SB02-01	EXPLOSIVES	REG	12-Sep-06	0	0.5	0.198	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.631	U	0.3155	35SUMP107-SB01	35-SMP107-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.194	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.637	U	0.3185	35SUMP107-SB01	35-SMP107-SB01-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.196	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.622	U	0.311	35SUMP107-SB02	35-SMP107-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.191	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.628	U	0.314	35SUMP107-SB02	35-SMP107-SB02-02	EXPLOSIVES	REG	14-Sep-06	3	3	0.193	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.631	U	0.3155	35SUMP118-SB01	35-SMP118-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.194	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.1	U	0.05	46SD01	46SD01-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	46SD02	46SD02-981109	EXPLOSIVES	REG	9-Nov-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.248	U	0.124	46SD02R-SB	46SD02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0992	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.232	U	0.116	46SD02R-SS	46SD02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.1	U	0.05	46SD05	AVG-46SD05-981110	EXPLOSIVES	AVG	10-Nov-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	46SD06	46SD06-981110	EXPLOSIVES	REG	10-Nov-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	49SB34	49SB34(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.857	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.18	U	0.09	49SB34	49SB34(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.814	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	UJ	0.095	49SB35	49SB35(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.663	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.185	U	0.0925	49SB35	AVG-49SB35(0-0.5)	EXPLOSIVES	AVG	7-Dec-00	0	0.5	0.789	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	49SB36	49SB36(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.865	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.18	U	0.09	49SB36	49SB36(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.814	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	55SB02	55SB02-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.2	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.631	U	0.3155	55SB03	55-SB03-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.194	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.644	U	0.322	55SB03	55-SB03-3.0	EXPLOSIVES	REG	27-Sep-06	3	3	0.198	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	55SB03	55-SB03-CONTENTS	EXPLOSIVES	REG	27-Sep-06	0	0	0.199	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	55SB04	55-SB04-1-2	EXPLOSIVES	REG	27-Sep-06	1	2	0.199	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.622	U	0.311	55SB06	55-SB06-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.191	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.628	U	0.314	55SB07	55-SB07-(1-2)	EXPLOSIVES	REG	27-Sep-06	1	2	0.193	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.2	U	0.1	67SB01	67SB01(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.878	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.18	U	0.09	67SB01	67SB01(1-3)	EXPLOSIVES	REG	6-Dec-00	1	3	0.8	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.18	U	0.09	67SB02	67SB02(0-0.5)	EXPLOSIVES	REG	14-Dec-00	0	0.5	0.826	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	UJ	0.1	67SB02	67SB02(1-2)	EXPLOSIVES	REG	6-Dec-00	1	2	0.882	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	67SB03	67SB03(0-0.5)	EXPLOSIVES	REG	7-Dec-00	0	0.5	0.849	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	67SB03	67SB03(1-3)	EXPLOSIVES	REG	7-Dec-00	1	3	0.865	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.147	U	0.0735	BTA-53-LHAAP-001-RS-01A	BTA-53-LHAAP-001-RS-01A	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0719	N	U	CAPE 2006
Tetryl	479-45-8	mg/kg	0.155	UJ	0.0775	BTA-53-LHAAP-001-RS-01B	BTA-53-LHAAP-001-RS-01B	EXPLOSIVES	REG	7-Sep-06	0	0.5	0.0719	N	U	CAPE 2006
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	CCSD01	CCSD01	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.2375	UU	0.11875	DL45-01R	DL45-01R-SB(.5-3)FDDL45-01R-SB(.5-3)	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.0948	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.25	U	0.125	DL45-01R	DL45-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.231	U	0.1155	DL74-01R	DL74-01R-SB(.5-2.2)	EXPLOSIVES	REG	26-Oct-13	0.5	2.2	0.0926	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.25	U	0.125	DL74-01R	DL74-01R-SS(0-0.4)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0999	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	DL75-01R	DL75-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.231	U	0.1155	DL75-01R	DL75-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0923	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.19	U	0.095	LAP-021	LAP-0210	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-021	LAP-0211	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-021	LAP-021A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-021	LAP-021B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	LAP-022	LAP-022A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-022	LAP-022B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-023	AVG-LAP-023A	EXPLOSIVES	AVG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-023	LAP-023B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-024	LAP-024A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-024	LAP-024B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-026	LAP-026A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	U	0.095	LAP-026	LAP-026B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.22	U	0.11	LAP-027	LAP-027A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-027	LAP-027B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.2	U	0.1	LAP-028	LAP-028A	EXPLOSIVES	REG	10-Jul-00	0	0.5		N	U	BERA EXP

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Tetryl	479-45-8	mg/kg	0.21	U	0.105	LAP-028	LAP-028B	EXPLOSIVES	REG	10-Jul-00	1	1.5		N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S021-01R	S021-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.24	U	0.12	LH-S021-01R	S021-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0959	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.243	U	0.1215	LH-S025-01R	S025-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	LH-S025-01R	S025-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.228	U	0.114	LH-S026-01R	S026-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0913	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	LH-S026-01R	S026-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.234	U	0.117	LH-S05-01R	S05-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S05-01R	S05-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	LH-S06-01R	S06-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0915	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S06-01R	S06-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0968	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S08-01R	S08-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.232	U	0.116	LH-S08-01R	S08-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0929	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.24	U	0.12	LH-S100-01R	S100-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.249	U	0.1245	LH-S100-01R	S100-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0997	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.24	U	0.12	LH-S10-01R	S10-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	LH-S10-01R	S10-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.243	U	0.1215	LH-S11-01R	S11-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.2435	UU	0.12175	LH-S11-01R	S11-01R-SS(0-.5)S11-01R-SS-FD	EXPLOSIVES	AVG	28-Oct-13	0	0.5	0.09725	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S111-01R	S111-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.25	U	0.125	LH-S111-01R	S111-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.1	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.248	U	0.124	LH-S112-01R	S112-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S112-01R	S112-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.254	U	0.127	LH-S113-01R	S113-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.102	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S113-01R	S113-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	LH-S117-01R	S117-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0914	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	LH-S117-01R	S117-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.25	U	0.125	LH-S12-01R	S12-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.1	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.237	U	0.1185	LH-S12-01R	S12-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.095	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.248	U	0.124	LH-S121-01R	S121-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0993	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.237	U	0.1185	LH-S121-01R	S121-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0946	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S14-02R	S14-02R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.254	U	0.127	LH-S14-02R	S14-02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.24	U	0.12	LH-S16-01R	S16-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0959	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.248	U	0.124	LH-S16-01R	S16-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0992	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S19-01R	S19-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0976	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	LH-S19-01R	S19-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	LH-S22-01R	S22-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.236	UU	0.118	LH-S22-01R	S22-01R-SS(0-.5)S22-01R-SS(0-.5)FD	EXPLOSIVES	AVG	27-Oct-13	0	0.5	0.0945	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.238	U	0.119	LH-S27-01R	S27-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0953	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.24	U	0.12	LH-S27-01R	S27-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	LH-S29-01R	S29-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	LH-S29-01R	S29-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.257	U	0.1285	LH-S30-01R	S30-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.103	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	LH-S30-01R	S30-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.092	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	LH-S32-01R	S32-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.248	U	0.124	LH-S32-01R	S32-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.099	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.239	U	0.1195	LH-S41-01R	S41-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0955	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.248	U	0.124	LH-S41-01R	S41-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.099	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S43-01R	S43-01R-SB(.5-3)	EXPLOSIVES	REG	28-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.237	U	0.1185	LH-S43-01R	S43-01R-SS(0-.5)	EXPLOSIVES	REG	28-Oct-13	0	0.5	0.0947	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	LH-S44-01R	S44-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0987	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.233	U	0.1165	LH-S44-01R	S44-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0932	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	LH-S47-01R	S47-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0918	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.239	U	0.1195	LH-S47-01R	S47-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0956	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.231	U	0.1155	LH-S48-01R	S48-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.243	U	0.1215	LH-S48-01R	S48-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0973	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0985	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	LH-S49-01R	S49-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0985	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.249	U	0.1245	LH-S50-01R	S50-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0994	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.236	U	0.118	LH-S50-01R	S50-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S55-01R	S55-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0969	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.245	U	0.1225	LH-S55-01R	S55-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0981	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S58-01R	S58-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0978	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	LH-S58-01R	S58-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0984	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.2425	UU	0.12125	LH-S59-01R	S59-01R-SB(.5-3)S59-01R-SB(.5-3)FD	EXPLOSIVES	AVG	26-Oct-13	0.5	3	0.097	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.239	U	0.1195	LH-S59-01R	S59-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0957	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.243	U	0.1215	LH-S61-01R	S61-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0973	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S61-01R	S61-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0975	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.245	U	0.1225	LH-S71-01R	S71-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0979	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	LH-S71-01R	S71-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0938	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	LH-S723-01R	S723-01R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0962	N	U	DATA GAPS

Table A-2
Analytical Data in the Revised Dataset for Soil in the Industrial Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
Tetryl	479-45-8	mg/kg	0.234	U	0.117	LH-S723-01R	S723-01R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0937	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.234	U	0.117	LH-S73-01R	S73-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0937	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.25	U	0.125	LH-S73-01R	S73-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.1	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.242	U	0.121	LH-S77-01R	S77-01R-SB(.5-3)	EXPLOSIVES	REG	26-Oct-13	0.5	3	0.0966	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	LH-S77-01R	S77-01R-SS(0-.5)	EXPLOSIVES	REG	26-Oct-13	0	0.5	0.0922	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	LH-S82-01R	S82-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0939	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	LH-S82-01R	S82-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0987	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.2395	UU	0.11975	LH-S83-01R	S83-01R-SB(.5-3)S83-01R-SB(.5-3)FD	EXPLOSIVES	AVG	27-Oct-13	0.5	3	0.09585	NN	UU	DATA GAPS
Tetryl	479-45-8	mg/kg	0.236	U	0.118	LH-S83-01R	S83-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0944	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	LH-S86-01R	S86-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0982	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S86-01R	S86-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.231	U	0.1155	LH-S88-01R	S88-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0923	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.241	U	0.1205	LH-S88-01R	S88-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0962	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.233	U	0.1165	LH-S89-02R	S89-02R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.093	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.249	U	0.1245	LH-S89-02R	S89-02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0996	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.24	U	0.12	LH-S92-01R	S92-01R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0961	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.234	U	0.117	LH-S92-01R	S92-01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0936	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	LH-S93-01R	S93-1R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.229	U	0.1145	LH-S93-01R	S93-1R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0917	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0975	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.244	U	0.122	LH-S94-01R	S94-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0976	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	LH-S95-01R	S95-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.236	U	0.118	LH-S95-01R	S95-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0943	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0986	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	LH-S97-01R	S97-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	LH-S98-01R	S98-01R-SB(.5-3)	EXPLOSIVES	REG	29-Oct-13	0.5	3	0.0938	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.253	U	0.1265	LH-S98-01R	S98-01R-SS(0-.5)	EXPLOSIVES	REG	29-Oct-13	0	0.5	0.101	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.249	U	0.1245	LHSMW01R	LHSMW01R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0995	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	LHSMW01R	LHSMW01R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0983	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.23	U	0.115	LHSMW02R	LHSMW02R-SB(.5-3)	EXPLOSIVES	REG	23-Oct-13	0.5	3	0.0921	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.247	U	0.1235	LHSMW02R	LHSMW02R-SS(0-.5)	EXPLOSIVES	REG	23-Oct-13	0	0.5	0.0989	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.227	U	0.1135	LHSMW67R	LHSMW67R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.091	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.254	U	0.127	LHSMW67R	LHSMW67R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.252	U	0.126	LHSMW68R	LHSMW68R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.101	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.256	U	0.128	LHSMW68R	LHSMW68R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.231	U	0.1155	LHSMW69R	LHSMW69R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0926	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.254	U	0.127	LHSMW69R	LHSMW69R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.246	U	0.123	LHSMW70R	LHSMW70R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0983	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.254	U	0.127	LHSMW70R	LHSMW70R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.243	U	0.1215	LHSMW71R	LHSMW71R-SB(.5-3)	EXPLOSIVES	REG	25-Oct-13	0.5	3	0.0972	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.255	U	0.1275	LHSMW71R	LHSMW71R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	N	U	DATA GAPS
Tetryl	479-45-8	mg/kg	0.25	U	0.125	MAM-GP150-SS	MAM-GP150-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.25	U	0.125	MAM-P2212-SS	MAM-P2212-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.1	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.24	U	0.12	MAM-P2237-SS	MAM-P2237-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.24	U	0.12	MAM-P2268-SS	MAM-P2268-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.24	U	0.12	MAM-P2544-SS	MAM-P2544-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.245	U	0.1225	MAM-P2571-SS	AVG-MAM-P2571-SS	EXPLOSIVES	AVG	25-Feb-04	0	0.5	0.098	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.23	U	0.115	MAM-P2586-SS	MAM-P2586-SS	EXPLOSIVES	REG	25-Feb-04	0	0.5	0.093	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.23	U	0.115	MAM-W220-SS	AVG-MAM-W220-SS	EXPLOSIVES	AVG	24-Feb-04	0	0.5	0.091	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.24	U	0.12	MAM-W250-SS	MAM-W250-SS	EXPLOSIVES	REG	24-Feb-04	0	0.5	0.097	N	U	BERA EXP
Tetryl	479-45-8	mg/kg	0.637	U	0.3185	WRS008-SB01	WRS008-SB01-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.196	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.628	U	0.314	WRS008-SB02	WRS008-SB02-01	EXPLOSIVES	REG	14-Sep-06	0.5	0.5	0.193	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.647	J	0.949	WRS019-SB01	WRS019-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.199	Y		Post BERA
Tetryl	479-45-8	mg/kg	0.65	U	0.325	WRS019-SB02	WRS019-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.2	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.625	U	0.3125	WRS021-SB01	WRS021-SB01-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.192	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.644	U	0.322	WRS021-SB02	WRS021-SB02-01	EXPLOSIVES	REG	26-Sep-06	0.5	0.5	0.198	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.637	U	0.3185	WRS10-SB02	WRS10-SB02-01	EXPLOSIVES	REG	25-Sep-06	0.5	0.5	0.196	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.625	UJ	0.3125	WRS14-SB01	WRS14-SB01-01	EXPLOSIVES	REG	14-Sep-06	1.5	1.5	0.192	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.628	U	0.314	WRSUMP005-SB01	WRSMP005-SB01-01	EXPLOSIVES	REG	22-Sep-06	0.5	0.5	0.193	N	U	Post BERA

[a] 2013 Data Gaps samples were analyzed using Method SW-846 8330a; CAPE 2006 samples were analyze using SW-846 8330; BERA and Post-BERA samples were analyzed using the method presented in the 2007 BERA and/or the environmental investigation report of their origin.

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.08	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.08	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.08	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.08	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.02	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.02	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.08	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.08	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	1.5		109	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	1.5	=	Y	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	1.5		14.7	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	1.5	=	Y	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15		0.62	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.15	=	Y	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	0.075	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.15	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.249	U	0.1245	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.243	U	0.1215	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.244	U	0.122	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.21	D	69	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22	D	13	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.22		0.54	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.07	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.07	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.07	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.07	<	N	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.02	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.02	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.07	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.07	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	0.025	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.05	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.249	U	0.1245	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.243	U	0.1215	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.244	U	0.122	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.21		1.7	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22		0.45	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.22		0.42	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.03	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	17EXC01-SB01	17EXC01-SB01(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0999	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	17EXC01-SB01	17EXC01-SB01(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0989	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	17EXC01-SB02	17EXC01-SB02(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0998	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	17EXC01-SB02	17EXC01-SB02(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0997	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	17EXC01-SB03	17EXC01-SB03(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0985	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	17EXC01-SB03	17EXC01-SB03(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0987	U	N	ADD'L WSA

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	17EXC01-SB04	17EXC01-SB04(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0998	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	17EXC01-SB04	17EXC01-SB04(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0987	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	17EXC01-SB05	17EXC01-SB05(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0993	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244		0.269	17EXC02-SB01	17EXC02-SB01(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0976		Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244		6.61	17EXC02-SB02	17EXC02-SB02(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0977		Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	2.49	U	1.245	17EXC02-SB03	17EXC02-SB03(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.995	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	17EXC02-SB04	17EXC02-SB04(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0986	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	17EXC02-SB04	17EXC02-SB04(2-3)	EXPLOSIVES	REG	16-SEP-10	2	3	0.0998	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	17EXC02-SB05	17EXC02-SB05(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.1	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	17EXC02-SB06	17EXC02-SB06(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0972	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	17EXC03-SB01	17EXC03-SB01(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0984	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	17EXC03-SB02	17EXC03-SB02(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.099	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.238	U	0.119	17EXC03-SB02	17EXC03-SB02(2-3)	EXPLOSIVES	REG	31-AUG-10	2	3	0.0953	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	2.45		22.3	17EXC03-SB03	17EXC03-SB03(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.978		Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	0.1225	17EXC03-SB03	17EXC03-SB03(2-4)	EXPLOSIVES	REG	31-AUG-10	2	4	0.0981	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241		0.675	17EXC03-SB08	17EXC03-SB08(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0963		Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	17EXC03-SB08	17EXC03-SB08(2-4)	EXPLOSIVES	REG	31-AUG-10	2	4	0.0977	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	17EXCO3-SB04	17EXCO3-SB04(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0983	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	17EXCO3-SB04	17EXCO3-SB04(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.099	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	17EXCO3-SB05	17EXCO3-SB05(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0989	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	17EXCO3-SB05	17EXCO3-SB05(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0994	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	17EXCO3-SB06	17EXCO3-SB06(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0997	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	17EXCO3-SB06	17EXCO3-SB06(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0997	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	0.123	17EXCO3-SB07	17EXCO3-SB07(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0984	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	17EXCO3-SB07	17EXCO3-SB07(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0994	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	J	0.208	17SB-B02	17SB-B02(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0997	J	Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249		0.755	17SB-B04	17SB-B04(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0995		Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.248	U	0.124	17SB-C04	17SB-C04(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.099	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.241		2.42	17SB-C05	17SB-C05(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0964		Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	0.1235	17SB-C05	17SB-C05(2.5-3.5)	EXPLOSIVES	REG	31-AUG-10	2.5	3.5	0.0989	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	17SB-D02	17SB-D02(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.0997	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	J	0.206	17SB-D03	17SB-D03(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.0971	J	Y	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.25	U	0.125	17SB-D04	17SB-D04(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.1	U	N	ADD'L WSA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	J	0.775	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	50		10000	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	50	=	Y	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	1		110	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	1	=	Y	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1		13	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	=	Y	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1		2.3	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	J	13	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.249	U	0.1245	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.243	U	0.1215	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.244	U	0.122	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22		6.6	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.379	U	0.1895	12SB01	12SB01(1.0-2.0)	SEMIVOLATILES	REG	1-Jun-93	1	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.407	U	0.2035	12WW01	12WW01(0-2)	SEMIVOLATILES	REG	27-Apr-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	12WW02	12WW02(0-2)	SEMIVOLATILES	REG	4-Feb-88	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	12WW02	C900204-12WW02-N02	SEMIVOLATILES	REG	4-Feb-90	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	2.2	U	1.1	12WW05	12WW05(0-1.5)	SEMIVOLATILES	REG	19-Apr-93	0	1.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.388	U	0.194	12WW07	12WW07(0-2)	SEMIVOLATILES	REG	19-Apr-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.418	U	0.209	16SD02	16SD02(0-1)	SEMIVOLATILES	REG	14-Apr-93	0	1	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.06	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.06	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.06	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.06	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.02	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.02	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.06	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.06	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	17EXC01-SB01	17EXC01-SB01(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0999	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	17EXC01-SB01	17EXC01-SB01(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0989	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	17EXC01-SB02	17EXC01-SB02(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0998	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	17EXC01-SB02	17EXC01-SB02(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0997	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	17EXC01-SB03	17EXC01-SB03(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0985	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	17EXC01-SB03	17EXC01-SB03(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0987	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	17EXC01-SB04	17EXC01-SB04(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0998	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	17EXC01-SB04	17EXC01-SB04(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0987	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	17EXC01-SB05	17EXC01-SB05(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0993	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	17EXC02-SB01	17EXC02-SB01(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0976	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	17EXC02-SB02	17EXC02-SB02(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0977	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	2.49	U	1.245	17EXC02-SB03	17EXC02-SB03(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.995	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	17EXC02-SB04	17EXC02-SB04(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0986	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	17EXC02-SB04	17EXC02-SB04(2-3)	EXPLOSIVES	REG	16-SEP-10	2	3	0.0998	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	17EXC02-SB05	17EXC02-SB05(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.1	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	17EXC02-SB06	17EXC02-SB06(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0972	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	17EXC03-SB01	17EXC03-SB01(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0984	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	17EXC03-SB02	17EXC03-SB02(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.099	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.238	U	0.119	17EXC03-SB02	17EXC03-SB02(2-3)	EXPLOSIVES	REG	31-AUG-10	2	3	0.0953	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	17EXC03-SB03	17EXC03-SB03(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0978	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	0.1225	17EXC03-SB03	17EXC03-SB03(2-4)	EXPLOSIVES	REG	31-AUG-10	2	4	0.0981	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241	U	0.1205	17EXC03-SB08	17EXC03-SB08(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0963	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	17EXC03-SB08	17EXC03-SB08(2-4)	EXPLOSIVES	REG	31-AUG-10	2	4	0.0977	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	17EXCO3-SB04	17EXCO3-SB04(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0983	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	17EXCO3-SB04	17EXCO3-SB04(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.099	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	17EXCO3-SB05	17EXCO3-SB05(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0989	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	17EXCO3-SB05	17EXCO3-SB05(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0994	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	17EXCO3-SB06	17EXCO3-SB06(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0997	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	17EXCO3-SB06	17EXCO3-SB06(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0997	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	0.123	17EXCO3-SB07	17EXCO3-SB07(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0984	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	17EXCO3-SB07	17EXCO3-SB07(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0994	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.398	U	0.199	17SB01	17SB01(02)	SEMIVOLATILES	REG	15-May-93	2.5	2.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.413	U	0.2065	17SB01	17SB01(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	759		7100	17SB02	17SB02(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	=	Y	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	1.988		13	17SB03	17SB03(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	=	Y	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.825		5.7	17SB04	17SB04(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	=	Y	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.413	U	0.2065	17SB05	17SB05(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	1.774		1.9	17SB06	17SB06(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	=	Y	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.402	U	0.201	17SB07	17SB07(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	17SB-B02	17SB-B02(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0997	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249		0.266	17SB-B04	17SB-B04(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0995		Y	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.248	U	0.124	17SB-C04	17SB-C04(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.099	U	N	ADD'L WSA

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.241		0.671	17SB-C05	17SB-C05(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0964		Y	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	0.1235	17SB-C05	17SB-C05(2.5-3.5)	EXPLOSIVES	REG	31-AUG-10	2.5	3.5	0.0989	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	17SB-D02	17SB-D02(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.0997	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243		0.405	17SB-D03	17SB-D03(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.0971		Y	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.25	U	0.125	17SB-D04	17SB-D04(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.1	U	N	ADD'L WSA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.493	U	0.2465	17SD01	17SD01	SEMIVOLATILES	REG	21-Apr-93	0	0	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.44	U	0.22	17SD02	17SD02	SEMIVOLATILES	REG	21-Apr-93	0	0	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1		0.445	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1		16	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1		0.75	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1		0.62	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1		3.4	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	1.964	U	0.982	17WW01	17WW01(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.446	U	0.223	18SD03	18SD03(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.452	U	0.226	18SD04	18SD04(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.423	U	0.2115	18SD05	18SD05(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.516	U	0.258	18SD06	18SD06(0-0.5)/FD	SEMIVOLATILES	REG/FD	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.446	U	0.223	18SD07	18SD07(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.446	U	0.223	18SD07	18SD07(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.493	U	0.2465	18SD08	18SD08(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.249	U	0.1245	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.243	U	0.1215	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.178	U	0.089	35SUMP115-SB01	35-SMP115-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.089	U	N	Post-BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.178	U	0.089	35SUMP116-SB01	35-SMP116-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.0888	U	N	Post-BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.377	U	0.1885	35SUMP116-SB02	35-SMP116-SB02-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.189	U	N	Post-BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0355	U	0.01775	FWS-088	CLNWR088	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0294	U	0.0147	FWS-101	CLNWR101	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.033	U	0.0165	FWS-108	CLNWR108	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0296	U	0.0148	FWS-119	CLNWR119	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0305	U	0.01525	FWS-123	CLNWR123	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.031	U	0.0155	FWS-124	CLNWR124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S115-01	LH-S115-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	<	N	BERA SVOC

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	0.165	LH-S115-02	LH-S115-02_1/FD	SEMIVOLATILES	REG/FD	4-Aug-93	0.6	2.6	0.33	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.379	U	0.1895	12SB01	12SB01(1.0-2.0)	SEMIVOLATILES	REG	1-Jun-93	1	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.407	U	0.2035	12WW01	12WW01(0-2)	SEMIVOLATILES	REG	27-Apr-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	12WW02	12WW02(0-2)	SEMIVOLATILES	REG	4-Feb-88	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	12WW02	C900204-12WW02-N02	SEMIVOLATILES	REG	4-Feb-90	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.398	U	0.199	12WW02	C930428-12WW02-N02	SEMIVOLATILES	REG	28-Apr-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	2.2	U	1.1	12WW05	12WW05(0-1.5)	SEMIVOLATILES	REG	19-Apr-93	0	1.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.388	U	0.194	12WW07	12WW07(0-2)	SEMIVOLATILES	REG	19-Apr-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.418	U	0.209	16SD02	16SD02(0-1)	SEMIVOLATILES	REG	14-Apr-93	0	1	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.08	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.08	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.08	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.08	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.02	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.02	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.08	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.08	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	17EXC01-SB01	17EXC01-SB01(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0999	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	17EXC01-SB01	17EXC01-SB01(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0989	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	17EXC01-SB02	17EXC01-SB02(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0998	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17EXC01-SB02	17EXC01-SB02(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0997	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	17EXC01-SB03	17EXC01-SB03(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0985	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	17EXC01-SB03	17EXC01-SB03(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0987	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	17EXC01-SB04	17EXC01-SB04(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0998	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	17EXC01-SB04	17EXC01-SB04(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.0987	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	17EXC01-SB05	17EXC01-SB05(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0993	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	17EXC02-SB01	17EXC02-SB01(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0976	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	17EXC02-SB02	17EXC02-SB02(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0977	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	2.49	U	1.245	17EXC02-SB03	17EXC02-SB03(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.995	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	17EXC02-SB04	17EXC02-SB04(0-2)	EXPLOSIVES	REG	16-SEP-10	0	2	0.0986	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	17EXC02-SB04	17EXC02-SB04(2-3)	EXPLOSIVES	REG	16-SEP-10	2	3	0.0998	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	17EXC02-SB05	17EXC02-SB05(2-4)	EXPLOSIVES	REG	16-SEP-10	2	4	0.1	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	U	0.1215	17EXC02-SB06	17EXC02-SB06(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0972	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	17EXC03-SB01	17EXC03-SB01(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0984	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	17EXC03-SB02	17EXC03-SB02(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.099	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.238	U	0.119	17EXC03-SB02	17EXC03-SB02(2-3)	EXPLOSIVES	REG	31-AUG-10	2	3	0.0953	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	17EXC03-SB03	17EXC03-SB03(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0978	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	0.1225	17EXC03-SB03	17EXC03-SB03(2-4)	EXPLOSIVES	REG	31-AUG-10	2	4	0.0981	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241	U	0.1205	17EXC03-SB08	17EXC03-SB08(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0963	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	17EXC03-SB08	17EXC03-SB08(2-4)	EXPLOSIVES	REG	31-AUG-10	2	4	0.0977	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	J	0.226	17EXCO3-SB04	17EXCO3-SB04(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0983	J	Y	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	17EXCO3-SB04	17EXCO3-SB04(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.099	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	17EXCO3-SB05	17EXCO3-SB05(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0989	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17EXCO3-SB05	17EXCO3-SB05(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0994	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17EXCO3-SB06	17EXCO3-SB06(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0997	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17EXCO3-SB06	17EXCO3-SB06(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0997	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	0.123	17EXCO3-SB07	17EXCO3-SB07(0-2)	EXPLOSIVES	REG	15-SEP-10	0	2	0.0984	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17EXCO3-SB07	17EXCO3-SB07(2-4)	EXPLOSIVES	REG	15-SEP-10	2	4	0.0994	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.398	U	0.199	17SB01	17SB01(02)	SEMIVOLATILES	REG	15-May-93	2.5	2.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.413	U	0.2065	17SB01	17SB01(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	152		760	17SB02	17SB02(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	=	Y	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	1.988		4.6	17SB03	17SB03(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	=	Y	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.825		1.8	17SB04	17SB04(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	=	Y	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.413	U	0.2065	17SB05	17SB05(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	1.774		9.3	17SB06	17SB06(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	=	Y	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.402	U	0.201	17SB07	17SB07(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17SB-B02	17SB-B02(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0997	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17SB-B04	17SB-B04(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.0995	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.248	U	0.124	17SB-C04	17SB-C04(0-2)	EXPLOSIVES	REG	30-AUG-10	0	2	0.099	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.241		0.265	17SB-C05	17SB-C05(0-2)	EXPLOSIVES	REG	31-AUG-10	0	2	0.0964		Y	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	0.1235	17SB-C05	17SB-C05(2.5-3.5)	EXPLOSIVES	REG	31-AUG-10	2.5	3.5	0.0989	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.249	U	0.1245	17SB-D02	17SB-D02(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.0997	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.243	J	0.107	17SB-D03	17SB-D03(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.0971	J	Y	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.25	U	0.125	17SB-D04	17SB-D04(0-2)	EXPLOSIVES	REG	27-AUG-10	0	2	0.1	U	N	ADD'L WSA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.493	U	0.2465	17SD01	17SD01	SEMIVOLATILES	REG	21-Apr-93	0	0	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.44	U	0.22	17SD02	17SD02	SEMIVOLATILES	REG	21-Apr-93	0	0	-0.099	<	N	BERA SVOC

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1		0.445	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1		16	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1		0.75	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1		0.62	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1		3.4	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	=	Y	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	1.964	U	0.982	17WW01	17WW01(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.446	U	0.223	18SD03	18SD03(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.452	U	0.226	18SD04	18SD04(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.423	U	0.2115	18SD05	18SD05(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.516	U	0.258	18SD06	18SD06(0-0.5)/FD	SEMIVOLATILES	REG/FD	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.446	U	0.223	18SD07	18SD07(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.493	U	0.2465	18SD08	18SD08(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.259	U	0.1295	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.252	U	0.126	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.178	U	0.089	35SUMP115-SB01	35-SMP115-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.089	U	N	Post-BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.178	U	0.089	35SUMP116-SB01	35-SMP116-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.0888	U	N	Post-BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.377	U	0.1885	35SUMP116-SB02	35-SMP116-SB02-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.189	U	N	Post-BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.21	D	27	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22		6.8	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.22		1.6	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0355	U	0.01775	FWS-088	CLNWR088	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0294	U	0.0147	FWS-101	CLNWR101	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.033	U	0.0165	FWS-108	CLNWR108	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0296	U	0.0148	FWS-119	CLNWR119	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0305	U	0.01525	FWS-123	CLNWR123	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.031	U	0.0155	FWS-124	CLNWR124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S115-01	LH-S115-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	0.165	LH-S115-02	LH-S115-02_1/FD	SEMIVOLATILES	REG/FD	4-Aug-93	0.6	2.6	0.33	<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.13	<	N	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.03	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.03	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05		0.2675	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05		0.64	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	=	Y	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	0.025	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.05	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.259	U	0.1295	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.252	U	0.126	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.254	U	0.127	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22		0.54	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.04	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.04	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.04	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.04	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.05	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.05	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.04	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.04	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.249	U	0.1245	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
2-Nitrotoluene	88-72-2	mg/kg	0.243	U	0.1215	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
2-Nitrotoluene	88-72-2	mg/kg	0.244	U	0.122	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
2-Nitrotoluene	88-72-2	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.07	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.07	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.07	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.07	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.06	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.06	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.07	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.07	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.249	U	0.1245	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
3-Nitrotoluene	99-08-1	mg/kg	0.243	U	0.1215	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
3-Nitrotoluene	99-08-1	mg/kg	0.244	U	0.122	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
3-Nitrotoluene	99-08-1	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.04	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.04	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05		0.2675	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05		0.64	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	=	Y	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.05	<	N	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.2425	UJUJ	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	0.025	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.05	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.259	U	0.1295	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.252	U	0.126	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.254	U	0.127	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22		0.51	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.07	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.07	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.07	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.07	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.05	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.05	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.07	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.07	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.249	U	0.1245	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
4-Nitrotoluene	99-99-0	mg/kg	0.243	U	0.1215	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
4-Nitrotoluene	99-99-0	mg/kg	0.244	U	0.122	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
4-Nitrotoluene	99-99-0	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.04	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.04	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.04	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.04	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.05	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.05	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.04	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.5	U	0.25	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.04	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
HMX	2691-41-0	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
HMX	2691-41-0	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
HMX	2691-41-0	mg/kg	2.19	U	1.095	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
HMX	2691-41-0	mg/kg	2.14	U	1.07	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
HMX	2691-41-0	mg/kg	2.15	U	1.075	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
HMX	2691-41-0	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.21		0.2875	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.21		0.81	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
HMX	2691-41-0	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.21		8.3	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
HMX	2691-41-0	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.24		12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
HMX	2691-41-0	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.21		5.4	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
HMX	2691-41-0	mg/kg	0.21		1.3	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
HMX	2691-41-0	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
HMX	2691-41-0	mg/kg	0.22		0.6	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.379	U	0.1895	12SB01	12SB01(1.0-2.0)	SEMIVOLATILES	REG	1-Jun-93	1	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.407	U	0.2035	12WW01	12WW01(0-2)	SEMIVOLATILES	REG	27-Apr-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	12WW02	12WW02(0-2)	SEMIVOLATILES	REG	4-Feb-88	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	12WW02	C900204-12WW02-N02	SEMIVOLATILES	REG	4-Feb-90	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.398	U	0.199	12WW02	C930428-12WW02-N02	SEMIVOLATILES	REG	28-Apr-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	2.2	U	1.1	12WW05	12WW05(0-1.5)	SEMIVOLATILES	REG	19-Apr-93	0	1.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.388	U	0.194	12WW07	12WW07(0-2)	SEMIVOLATILES	REG	19-Apr-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.418	U	0.209	16SD02	16SD02(0-1)	SEMIVOLATILES	REG	14-Apr-93	0	1	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.05	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.05	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.05	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.05	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.03	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.03	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.05	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.25	U	0.125	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.05	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.398	U	0.199	17SB01	17SB01(02)	SEMIVOLATILES	REG	15-May-93	2.5	2.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.413	U	0.2065	17SB01	17SB01(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	1.897	U	0.9485	17SB02	17SB02(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	1.988	U	0.994	17SB03	17SB03(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.825	U	0.4125	17SB04	17SB04(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.413	U	0.2065	17SB05	17SB05(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	1.774	U	0.887	17SB06	17SB06(0-2)	SEMIVOLATILES	REG	15-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.402	U	0.201	17SB07	17SB07(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.493	U	0.2465	17SD01	17SD01	SEMIVOLATILES	REG	21-Apr-93	0	0	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.44	U	0.22	17SD02	17SD02	SEMIVOLATILES	REG	21-Apr-93	0	0	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	1.964	U	0.982	17WW01	17WW01(0-2)	SEMIVOLATILES	REG	16-May-93	0	2	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.446	U	0.223	18SD03	18SD03(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.452	U	0.226	18SD04	18SD04(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.423	U	0.2115	18SD05	18SD05(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.516	U	0.258	18SD06	18SD06(0-0.5)/FD	SEMIVOLATILES	REG/FD	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.446	U	0.223	18SD07	18SD07(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.493	U	0.2465	18SD08	18SD08(0-0.5)	SEMIVOLATILES	REG	2-May-93	0	0.5	-0.099	<	N	BERA SVOC

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
Nitrobenzene	98-95-3	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.259	U	0.1295	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.129	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.252	U	0.126	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.126	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.178	U	0.089	35SUMP115-SB01	35-SMP115-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.089	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.178	U	0.089	35SUMP116-SB01	35-SMP116-SB01-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.0888	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.377	U	0.1885	35SUMP116-SB02	35-SMP116-SB02-01	SEMIVOLATILES	REG	19-Sep-06	0.5	0.5	0.189	U	N	Post-BERA
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.0355	U	0.01775	FWS-088	CLNWR088	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0294	U	0.0147	FWS-101	CLNWR101	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.033	U	0.0165	FWS-108	CLNWR108	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0296	U	0.0148	FWS-119	CLNWR119	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.0305	U	0.01525	FWS-123	CLNWR123	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.031	U	0.0155	FWS-124	CLNWR124	SEMIVOLATILES	REG	9-Sep-03	0	0.5		U	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S115-01	LH-S115-01_1	SEMIVOLATILES	REG	4-Aug-93	0.5	1	0.33	<	N	BERA SVOC
Nitrobenzene	98-95-3	mg/kg	0.33	U	0.165	LH-S115-02	LH-S115-02_1/FD	SEMIVOLATILES	REG/FD	4-Aug-93	0.6	2.6	0.33	<	N	BERA SVOC
RDX	121-82-4	mg/kg	0.248	U	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.245	U	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.243	U	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.235	U	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.09	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.09	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.09	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.09	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.05	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.05	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.09	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.5	U	0.25	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.09	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
RDX	121-82-4	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
RDX	121-82-4	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
RDX	121-82-4	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.995	U	0.4975	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0995	U	N	Post-BERA
RDX	121-82-4	mg/kg	0.971	U	0.4855	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.0971	U	N	Post-BERA
RDX	121-82-4	mg/kg	0.976	U	0.488	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.0976	U	N	Post-BERA
RDX	121-82-4	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
RDX	121-82-4	mg/kg	0.21		0.8	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
RDX	121-82-4	mg/kg	0.22		0.22	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	=	Y	BERA EXP
RDX	121-82-4	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.248	UJ	0.124	12SB01R	12SB01(DS)R-SB(.5-3)	EXPLOSIVES	REG	27-Oct-13	0.5	3	0.0991	Q	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.245	UJ	0.1225	12WW01R	12WW01R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0981	Q	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.243	UJ	0.1215	12WW02R	12WW02R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0972	Q	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.235	UJ	0.1175	12WW05R	12WW05R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.094	Q	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.244	U	0.122	12WW07R	12WW07R-SS(0-.5)	EXPLOSIVES	REG	27-Oct-13	0	0.5	0.0978	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.255	U	0.1275	16SD02R	16SD02R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.102	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW27	16WW27(0-0.5)	EXPLOSIVES	REG	17-May-97	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW27	16WW27(1-3)	EXPLOSIVES	REG	17-May-97	1	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW31	16WW31(0-0.5)	EXPLOSIVES	REG	29-May-97	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW31	16WW31(1-3)	EXPLOSIVES	REG	29-May-97	1	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW35	16WW35(0-0.5)/FD	EXPLOSIVES	REG/FD	25-Jun-97	0	0.5	0.05	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW35	16WW35(1-3)	EXPLOSIVES	REG	25-Jun-97	1	3	0.05	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW37	16WW37(0-0.5)	EXPLOSIVES	REG	31-May-97	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.65	U	0.325	16WW37	16WW37(1-3)	EXPLOSIVES	REG	31-May-97	1	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SD10	17SD10/FD	EXPLOSIVES	REG/FD	17-Sep-98	0	0	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SD11	17SD11	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SD12	17SD12	EXPLOSIVES	REG	17-Sep-98	0	0	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS21	17SS21(0-0.5)/FD	EXPLOSIVES	REG/FD	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS21	17SS21(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS22	17SS22(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS22	17SS22(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS23	17SS23(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS23	17SS23(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS24	17SS24(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SS24	17SS24(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS25	17SS25(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS25	17SS25(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS26	C-17SS26(0-0.5)-9807	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS26	C-17SS26(1-3)-980711	EXPLOSIVES	REG	11-Jul-98	1	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SS27	17SS27(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SS27	17SS27(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SS28	17SS28(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SS28	17SS28(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SS29	17SS29(0-0.5)	EXPLOSIVES	REG	11-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	0.05	17SS29	17SS29(2.5-3)	EXPLOSIVES	REG	11-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS31	17SS31(0-0.5)	EXPLOSIVES	REG	14-Jul-98	0	0.5	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	0.05	17SS31	17SS31(2.5-3)/FD	EXPLOSIVES	REG/FD	14-Jul-98	2.5	3	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.242	U	0.121	18SD03R	18SD03R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0966	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.251	U	0.1255	18SD04R	18SD04R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.101	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.2425	UU	0.12125	18SD05R	18SD05R-SS(0-.5)18SD05R-SS(0-.5)FD	EXPLOSIVES	AVG	25-Oct-13	0	0.5	0.09695	UU	NN	Data Gaps
Tetryl	479-45-8	mg/kg	0.244	U	0.122	18SD06R	18SD06R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0977	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.233	U	0.1165	18SD07R	18SD07R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0931	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.235	U	0.1175	18SD08R	18SD08R-SS(0-.5)	EXPLOSIVES	REG	25-Oct-13	0	0.5	0.0941	U	N	Data Gaps
Tetryl	479-45-8	mg/kg	0.1	U	0.05	18SD29	18SD29	EXPLOSIVES	REG	7-Oct-98	0	0	0.1	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.647	U	0.3235	35SUMP114-SB01	35-SMP114-SB01-01	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.199	U	N	Post-BERA
Tetryl	479-45-8	mg/kg	0.631	U	0.3155	35SUMP114-SB01	35-SMP114-SB01-02	EXPLOSIVES	REG	15-Sep-06	0.5	0.5	0.194	U	N	Post-BERA
Tetryl	479-45-8	mg/kg	0.634	U	0.317	35SUMP115-SB01	35-SMP115-SB01-01	EXPLOSIVES	REG	19-Sep-06	0.5	0.5	0.195	U	N	Post-BERA
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-02	COE17-02-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-03	COE17-03-01/FD	EXPLOSIVES	REG/FD	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.22	U	0.11	COE17-04	COE17-04-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-05	COE17-05-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-06	COE17-06-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP

Table A-3
Analytical Data in the Revised Dataset for Soil in the Waste Sub-Area
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNUM	UNIT	DETLIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	START_DEPTH	END_DEPTH	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-07	COE17-07-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.22	U	0.11	COE17-08	COE17-08-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-09	COE17-09-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.23	U	0.115	COE17-10	COE17-10-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.24	U	0.12	COE17-11	COE17-11-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.22	U	0.11	COE17-12	COE17-12-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-13	COE17-13-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.21	U	0.105	COE17-14	COE17-14-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.22	U	0.11	COE17-15	COE17-15-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP
Tetryl	479-45-8	mg/kg	0.22	U	0.11	COE17-16	COE17-16-01	EXPLOSIVES	REG	1-Sep-98	0	0.5	-0.099	<	N	BERA EXP

[a] 2013 Data Gaps samples were analyzed using Method SW-846 8330a; Add'l WSA samples for LHAAP-17 were analytzed using Method SW-846 8330; BERA and Post-BERA samples were analyzed using the method presented in the 2007 BERA and/or the environmental investigation report of their origin.

APPENDIX B

Analytical Data in the Revised Dataset for Sediment (Harrison Bayou)

Table B-1
Analytical Data in the Revised Dataset for Sediment in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VALIDATION_QUALIFIER	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.0402	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	150	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	150	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	150	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	150	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	150	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.15	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	150	N	<	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
1,3-Dinitrobenzene	99-65-0	mg/kg	0.0372	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	50	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	50	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	50	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
1,3-Dinitrobenzene	99-65-0	mg/kg	0.05	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
1,3-Dinitrobenzene	99-65-0	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.092	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0516	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
2,4-Dinitrotoluene	121-14-2	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,4-Dinitrotoluene	121-14-2	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
2,4-Dinitrotoluene	121-14-2	mg/kg	0.569	U	ND	16SD01	16SD01(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC

Table B-1
Analytical Data in the Revised Dataset for Sediment in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VALIDATION_QUALIFIER	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	mg/kg	0.429	U	ND	16SD03	16SD03(0-1)	SEMIVOLATILES	REG	14-Apr-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.407	U	ND	16SD04	16SD04(0-1)	SEMIVOLATILES	REG	14-Apr-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.55	U	ND	16SD05	16SD05(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.559	U	ND	16SD05	16SD05(0-0.5)FD	SEMIVOLATILES	FD	2-May-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.413	U	ND	17SD03	17SD03	SEMIVOLATILES	REG	21-Apr-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.43	U	ND	17SD14	17SD14	SEMIVOLATILES	REG	17-Sep-98	430	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.429	U	ND	18SD01	18SD01(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.418	U	ND	18SD01	18SD01(0-0.5)FD	SEMIVOLATILES	FD	2-May-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.485	U	ND	18SD02	18SD02(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.55	U	ND	18SD27	18SD27	SEMIVOLATILES	REG	7-Oct-98	550	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.52	U	ND	18SD27	18SD27FD	SEMIVOLATILES	FD	7-Oct-98	520	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.44	U	ND	18SD28	18SD28	SEMIVOLATILES	REG	12-Nov-98	440	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	ND	27SD02	LH27-SD02	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	ND	27SD03	LH27-SD03	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	ND	27SD04	LH27-SD04	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0361	nv	ND	FWS-149	CLNWR149	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.078	nv	ND	FWS-153	CLNWR153	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0764	nv	ND	FWS-154	CLNWR154	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0552	nv	ND	FWS-162	CLNWR162	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0525	nv	ND	FWS-163	CLNWR163	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0434	nv	ND	FWS-170	CLNWR170	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.0433	nv	ND	FWS-171	CLNWR171	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.51	U	ND	HBSD01	P3HBSD01	SEMIVOLATILES	REG	17-Sep-98	510	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	ND	XXSD01	LHXX-SD01	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.4	U	ND	XXSD15	C940823-XXSD15-N00	SEMIVOLATILES	REG	23-Aug-94	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	ND	XXSD15	XXSD15-930331	SEMIVOLATILES	REG	31-Mar-93	-99	N	<	BERA SVOC
2,4-Dinitrotoluene	121-14-2	mg/kg	0.33	U	ND	XXSD15	XXSD15-930331FD	SEMIVOLATILES	FD	31-Mar-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0476	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
2,6-Dinitrotoluene	606-20-2	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
2,6-Dinitrotoluene	606-20-2	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
2,6-Dinitrotoluene	606-20-2	mg/kg	0.569	U	ND	16SD01	16SD01(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.429	U	ND	16SD03	16SD03(0-1)	SEMIVOLATILES	REG	14-Apr-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.407	U	ND	16SD04	16SD04(0-1)	SEMIVOLATILES	REG	14-Apr-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.55	U	ND	16SD05	16SD05(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.559	U	ND	16SD05	16SD05(0-0.5)FD	SEMIVOLATILES	FD	2-May-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.413	U	ND	17SD03	17SD03	SEMIVOLATILES	REG	21-Apr-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.43	U	ND	17SD14	17SD14	SEMIVOLATILES	REG	17-Sep-98	430	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.429	U	ND	18SD01	18SD01(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.418	U	ND	18SD01	18SD01(0-0.5)FD	SEMIVOLATILES	FD	2-May-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.485	U	ND	18SD02	18SD02(0-0.5)	SEMIVOLATILES	REG	2-May-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.55	U	ND	18SD27	18SD27	SEMIVOLATILES	REG	7-Oct-98	550	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.52	U	ND	18SD27	18SD27FD	SEMIVOLATILES	FD	7-Oct-98	520	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.44	U	ND	18SD28	18SD28	SEMIVOLATILES	REG	12-Nov-98	440	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	ND	27SD02	LH27-SD02	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	ND	27SD03	LH27-SD03	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	ND	27SD04	LH27-SD04	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0361	nv	ND	FWS-149	CLNWR149	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.078	nv	ND	FWS-153	CLNWR153	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0764	nv	ND	FWS-154	CLNWR154	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0552	nv	ND	FWS-162	CLNWR162	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0525	nv	ND	FWS-163	CLNWR163	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0434	nv	ND	FWS-170	CLNWR170	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.0433	nv	ND	FWS-171	CLNWR171	SEMIVOLATILES	REG	9-Sep-03	-99000	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.51	U	ND	HBSD01	P3HBSD01	SEMIVOLATILES	REG	17-Sep-98	510	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	ND	XXSD01	LHXX-SD01	SEMIVOLATILES	REG	30-Mar-93	-99	N	<	BERA SVOC

Table B-1
Analytical Data in the Revised Dataset for Sediment in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VALIDATION_QUALIFIER	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	mg/kg	0.4	U	ND	XXSD15	C940823-XXSD15-N00	SEMIVOLATILES	REG	23-Aug-94	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	ND	XXSD15	XXSD15-930331	SEMIVOLATILES	REG	31-Mar-93	-99	N	<	BERA SVOC
2,6-Dinitrotoluene	606-20-2	mg/kg	0.33	U	ND	XXSD15	XXSD15-930331FD	SEMIVOLATILES	FD	31-Mar-93	-99	N	<	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.0467	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	50	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	50	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	50	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.05	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
2-Nitrotoluene	88-72-2	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
2-Nitrotoluene	88-72-2	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
3-Nitrotoluene	99-08-1	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.0409	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	50	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	50	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	50	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.05	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	50	N	<	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
4-Nitrotoluene	99-99-0	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
4-Nitrotoluene	99-99-0	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.073	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP

Table B-1
Analytical Data in the Revised Dataset for Sediment in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VALIDATION_QUALIFIER	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
HMX	2691-41-0	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
HMX	2691-41-0	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
HMX	2691-41-0	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
m-Nitrotoluene	99-08-1	mg/kg	0.0818	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
m-Nitrotoluene	99-08-1	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
m-Nitrotoluene	99-08-1	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
m-Nitrotoluene	99-08-1	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
m-Nitrotoluene	99-08-1	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
m-Nitrotoluene	99-08-1	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
m-Nitrotoluene	99-08-1	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
m-Nitrotoluene	99-08-1	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
Nitrobenzene	98-95-3	mg/kg	0.0352	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
Nitrobenzene	98-95-3	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
Nitrobenzene	98-95-3	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
o-Nitrotoluene	88-72-2	mg/kg	0.0814	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
o-Nitrotoluene	88-72-2	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
o-Nitrotoluene	88-72-2	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
o-Nitrotoluene	88-72-2	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
o-Nitrotoluene	88-72-2	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
o-Nitrotoluene	88-72-2	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
o-Nitrotoluene	88-72-2	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
o-Nitrotoluene	88-72-2	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
p-Nitrotoluene	99-99-0	mg/kg	0.0872	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
p-Nitrotoluene	99-99-0	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
p-Nitrotoluene	99-99-0	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
p-Nitrotoluene	99-99-0	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
p-Nitrotoluene	99-99-0	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
p-Nitrotoluene	99-99-0	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
p-Nitrotoluene	99-99-0	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
p-Nitrotoluene	99-99-0	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
RDX	121-82-4	mg/kg	0.0509	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
RDX	121-82-4	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
RDX	121-82-4	mg/kg	0.1	U	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP

Table B-1
Analytical Data in the Revised Dataset for Sediment in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VALIDATION_QUALIFIER	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	DETECT	QUALIFIER	SOURCE [a]
RDX	121-82-4	mg/kg	0.19	U	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA
Tetryl	479-45-8	mg/kg	0.163	U	ND	16SD35	16SD35	EXPLOSIVES	REG	29-Oct-97	-99	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	ND	17SD13	17SD13	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	UJ	ND	17SD14	17SD14	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	ND	18SD27	18SD27	EXPLOSIVES	REG	7-Oct-98	100	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	ND	18SD27	18SD27FD	EXPLOSIVES	FD	7-Oct-98	100	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.1	U	ND	18SD28	18SD28	EXPLOSIVES	REG	12-Nov-98	100	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.229	U	ND	HB-ABERA-01SD	HB-ABERA-01SD	EXPLOSIVES	TRG	24-Oct-13	0.0914	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.239	U	ND	HB-ABERA-02SD	HB-ABERA-02SD	EXPLOSIVES	TRG	24-Oct-13	0.0958	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.247	U	ND	HB-ABERA-03SD	HB-ABERA-03SD	EXPLOSIVES	TRG	24-Oct-13	0.0988	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.234	U	ND	HB-ABERA-04SD	HB-ABERA-04SD	EXPLOSIVES	TRG	24-Oct-13	0.0935	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD	EXPLOSIVES	TRG	24-Oct-13	0.0978	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.245	U	ND	HB-ABERA-05SD	HB-ABERA-05SD-FD	EXPLOSIVES	TRG	24-Oct-13	0.0979	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.246	U	ND	HB-ABERA-06SD	HB-ABERA-06SD	EXPLOSIVES	TRG	24-Oct-13	0.0983	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.236	U	ND	HB-ABERA-07SD	HB-ABERA-07SD	EXPLOSIVES	TRG	24-Oct-13	0.0943	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.233	U	ND	HB-ABERA-08SD	HB-ABERA-08SD	EXPLOSIVES	TRG	24-Oct-13	0.093	N	U	Data Gaps
Tetryl	479-45-8	mg/kg	0.1	UJ	ND	HBSD01	P3HBSD01	EXPLOSIVES	REG	17-Sep-98	100	N	<	BERA EXP
Tetryl	479-45-8	mg/kg	0.19	UJL	ND	IWSD17	IWSD17	EXPLOSIVES	REG	16-Sep-04	-99	N	U	Post BERA

ND - Not detected

[a] 2013 Data Gaps samples were analyzed using Method SW-846 8330a; BERA and Post-BERA samples were analyzed using the method presented in the 2007 BERA and/or the environmental investigation report of their origin.

APPENDIX C

Analytical Data in the Revised Dataset for Surface Water (Harrison Bayou)

Table C-1
Analytical Data in the Revised Dataset for Surface Water in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.39	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.39	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.26	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.26	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.26	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
1,3,5-Trinitrobenzene	99-35-4	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.13	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
1,3-Dinitrobenzene	99-65-0	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,4,6-Trinitrotoluene	118-96-7	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps

Table C-1
Analytical Data in the Revised Dataset for Surface Water in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,4-Dinitrotoluene	121-14-2	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,4-Dinitrotoluene	121-14-2	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
2,4-Dinitrotoluene	121-14-2	ug/L	10	UJ	ND	16SW01	16SW01-930504	SEMIVOLATILES	REG	4-May-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	UJ	ND	16SW03	16SW03-930414	SEMIVOLATILES	REG	14-Apr-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	UJ	ND	16SW04	16SW04-930414	SEMIVOLATILES	REG	14-Apr-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	UJ	ND	16SW05	16SW05-930513	SEMIVOLATILES	REG	13-May-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	17SW14	17SW14-980917	SEMIVOLATILES	REG	17-Sep-98	10	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	UJ	ND	18SW01	18SW01-930613	SEMIVOLATILES	REG	13-Jun-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	UJ	ND	18SW02	18SW02-930511	SEMIVOLATILES	REG	11-May-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	18SW27	18SW27-981007	SEMIVOLATILES	REG	7-Oct-98	10	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	18SW27	18SW27-981007-FD	SEMIVOLATILES	FD	7-Oct-98	10	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	18SW28	18SW28-981112	SEMIVOLATILES	REG	12-Nov-98	10	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	27SW02	27SW02-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	11	U	ND	27SW03	27SW03-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	11	U	ND	27SW04	27SW04-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	HBSW01	HBSW01-980917	SEMIVOLATILES	REG	17-Sep-98	10	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	HBSW01	HBSW01-980917FD	SEMIVOLATILES	FD	17-Sep-98	10	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	HBSW01	HBSW01-981204	SEMIVOLATILES	REG	4-Dec-98	10	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	XXSW01	XXSW01-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	XXSW15	XXSW15-930331	SEMIVOLATILES	REG	31-Mar-93	-99	<	N	BERA SVOC
2,4-Dinitrotoluene	121-14-2	ug/L	10	U	ND	XXSW15	XXSW15-930331FD	SEMIVOLATILES	FD	31-Mar-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2,6-Dinitrotoluene	606-20-2	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	16SW01	16SW01-930504	SEMIVOLATILES	REG	4-May-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	16SW03	16SW03-930414	SEMIVOLATILES	REG	14-Apr-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	16SW04	16SW04-930414	SEMIVOLATILES	REG	14-Apr-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	16SW05	16SW05-930513	SEMIVOLATILES	REG	13-May-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	17SW14	17SW14-980917	SEMIVOLATILES	REG	17-Sep-98	10	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	18SW01	18SW01-930613	SEMIVOLATILES	REG	13-Jun-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	18SW02	18SW02-930511	SEMIVOLATILES	REG	11-May-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	18SW27	18SW27-981007	SEMIVOLATILES	REG	7-Oct-98	10	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	18SW27	18SW27-981007-FD	SEMIVOLATILES	FD	7-Oct-98	10	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	18SW28	18SW28-981112	SEMIVOLATILES	REG	12-Nov-98	10	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	27SW02	27SW02-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	11	U	ND	27SW03	27SW03-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	11	U	ND	27SW04	27SW04-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	HBSW01	HBSW01-980917	SEMIVOLATILES	REG	17-Sep-98	10	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	HBSW01	HBSW01-980917FD	SEMIVOLATILES	FD	17-Sep-98	10	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	HBSW01	HBSW01-981204	SEMIVOLATILES	REG	4-Dec-98	10	<	N	BERA SVOC

Table C-1
Analytical Data in the Revised Dataset for Surface Water in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	XXSW01	XXSW01-930330	SEMIVOLATILES	REG	30-Mar-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	XXSW15	XXSW15-930331	SEMIVOLATILES	REG	31-Mar-93	-99	<	N	BERA SVOC
2,6-Dinitrotoluene	606-20-2	ug/L	10	U	ND	XXSW15	XXSW15-930331FD	SEMIVOLATILES	FD	31-Mar-93	-99	<	N	BERA SVOC
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.13	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
2-Amino-4,6-dinitrotoluene	35572-78-2	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
2-Nitrotoluene	88-72-2	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
2-Nitrotoluene	88-72-2	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
2-Nitrotoluene	88-72-2	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
2-Nitrotoluene	88-72-2	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
2-Nitrotoluene	88-72-2	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
3-Nitrotoluene	99-08-1	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
3-Nitrotoluene	99-08-1	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
3-Nitrotoluene	99-08-1	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
3-Nitrotoluene	99-08-1	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
3-Nitrotoluene	99-08-1	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.13	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
4-Amino-2,6-dinitrotoluene	19406-51-0	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
4-Nitrotoluene	99-99-0	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
4-Nitrotoluene	99-99-0	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
4-Nitrotoluene	99-99-0	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
4-Nitrotoluene	99-99-0	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
4-Nitrotoluene	99-99-0	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
HMX	2691-41-0	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
HMX	2691-41-0	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
HMX	2691-41-0	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps

Table C-1
Analytical Data in the Revised Dataset for Surface Water in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
HMX	2691-41-0	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
HMX	2691-41-0	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
HMX	2691-41-0	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.26	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
HMX	2691-41-0	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.26	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
m-Nitrotoluene	99-08-1	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
Nitrobenzene	98-95-3	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
Nitrobenzene	98-95-3	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
Nitrobenzene	98-95-3	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
Nitrobenzene	98-95-3	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
Nitrobenzene	98-95-3	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.26	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
o-Nitrotoluene	88-72-2	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
p-Nitrotoluene	99-99-0	ug/L	0.26	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP

Table C-1
Analytical Data in the Revised Dataset for Surface Water in Harrison Bayou
BERA Addendum
Longhorn Army Ammunition Plant, Karnack, Texas

PARAMETER	CASNO	UNITS	DETECT_LIMIT	VQUAL	RESULT	LOCATION_CODE	SAMPLE_NO	USER_TEST_GROUP	SAMPLE_PURPOSE	SAMPLE_DATE	METHOD_DETECTION_LIMIT	QUALIFIER	DETECT	SOURCE [a]
p-Nitrotoluene	99-99-0	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
RDX	121-82-4	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
RDX	121-82-4	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
RDX	121-82-4	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
RDX	121-82-4	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
RDX	121-82-4	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
RDX	121-82-4	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
RDX	121-82-4	ug/L	0.26	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
RDX	121-82-4	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
Tetryl	479-45-8	ug/L	0.26	U	ND	17SW13	17SW13-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.26	U	ND	17SW14	17SW14-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.26	U	ND	18SW27	18SW27-981007	EXPLOSIVES	REG	7-Oct-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.26	U	ND	18SW27	18SW27-981007-FD	EXPLOSIVES	FD	7-Oct-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.26	U	ND	18SW28	18SW28-981112	EXPLOSIVES	REG	12-Nov-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	2.7	U	ND	HB-ABERA-01SW	HB-ABERA-01SW	EXPLOSIVES	TRG	24-Oct-13	0.676	U	N	Data Gaps
Tetryl	479-45-8	ug/L	2.44	U	ND	HB-ABERA-03SW	HB-ABERA-03SW	EXPLOSIVES	TRG	24-Oct-13	0.61	U	N	Data Gaps
Tetryl	479-45-8	ug/L	2.63	U	ND	HB-ABERA-04SW	HB-ABERA-04SW	EXPLOSIVES	TRG	24-Oct-13	0.658	U	N	Data Gaps
Tetryl	479-45-8	ug/L	3.33	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW	EXPLOSIVES	TRG	24-Oct-13	0.833	Q	N	Data Gaps
Tetryl	479-45-8	ug/L	2.86	UJ	ND	HB-ABERA-07SW	HB-ABERA-07SW-FD	EXPLOSIVES	TRG	24-Oct-13	0.714	Q	N	Data Gaps
Tetryl	479-45-8	ug/L	0.26	U	ND	HBSW01	HBSW01-980917	EXPLOSIVES	REG	17-Sep-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.26	U	ND	HBSW01	HBSW01-980917FD	EXPLOSIVES	FD	17-Sep-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.26	U	ND	HBSW01	HBSW01-981204	EXPLOSIVES	REG	4-Dec-98	0.26	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.13	U	ND	HBW-1	HBW-1-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.13	U	ND	HBW-5	HBW-5-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.13	U	ND	HBW-6A	HBW-6A-960807	EXPLOSIVES	REG	7-Aug-96	-99	<	N	BERA EXP
Tetryl	479-45-8	ug/L	0.2	UJL	ND	IWSW17	IWSW17-040916	EXPLOSIVES	REG	16-Sep-04	-99	U	N	Post BERA
ND - Not detected														
[a] 2013 Data Gaps samples were analyzed using Method SW-846 8330a; BERA and Post-BERA samples were analyzed using the method presented in the 2007 BERA and/or the environmental investigation report of their origin.														

APPENDIX D

Field Variances That Occurred During Replacement Sample Collection

Table D-1
List of Field Variances for 2013 Replacement Samples
Longhorn Army Ammunition Plant, Karnack, Texas

Sample ID	Sub-area or Watershed	Date Collected	Revised Sample ID	Description of Variance	Reason for Variance
29SB13R-SS (0-0.5′) 29SB13R-SB (0.5-3′)	ISA	10/23/2013	NA	Moved sample location about 30′ northeast of original location	Unable to auger due to coarse gravel at the surface at original location
32SB14R-SS (0-0.5′) 32SB14R-SB (0.5-3′)	ISA	10/23/2013	NA	Moved sample location about 20′ northeast of original location	Unable to sample due to standing water at original location
32SS03R (0-0.5′) 32SS03R (0.5-3′)	ISA	10/23/2013	NA	Moved sample location about 20′ northeast of original location	Unable to sample due to standing water at original location
32WL01R-SB (0.5-3′)	ISA	10/25/2013	32WL01R-SB (0.5-2′)	Terminated boring at 2′ depth; collected composite subsurface soil sample from 0.5-2′ depth	Encountered suspected abandoned utility line at 2′ depth
LH-S112-01R-SB (0-0.5′) LH-S112-01R-SB (0.5-3′)	ISA	10/25/2013	NA	Moved sample location approximately 10′ northwest of original location	Encountered heavy aggregate material in borehole at original borehole
LH-DL45-01R-SB (0.5-3′) LH-DL45-01R-SB (0.5-3′) FD	ISA	10/26/2013	NA	Collected subsurface samples from second borehole located approximately 7′ northeast of original borehole	Unable to advance original borehole to total depth due to impenetrable surface (depth not indicated)
LH-S44-01R-SB (0.5-3′) LH-S44-01R-SB (0.5-3′) MS/MSD	ISA	10/26/2013	NA	Collected subsurface samples from second borehole located approximately 20′ east of original borehole	Hit refusal in original borehole (depth not indicated)
LH-S93-01R-SS (0-0.5′) LH-S93-01R-SB (0.5-3′)	ISA	10/27/2013	NA	Collected subsurface sample from second borehole located about 8′ northeast of original borehole	Hit refusal at 1′ depth in original borehole
LH-S10-01R-SS (0-0.5′) LH-S10-01R-SB (0.5-3′)	ISA	10/28/2013	NA	Collected subsurface sample from second borehole located about 9′ north of original borehole	Hit refusal in original borehole (depth not indicated)
LH-S06-01R-SS (0-0.5′) LH-S06-01R-SB (0.5-3′)	ISA	10/28/2013	NA	Moved sample location about 15′ south-southeast of original location	Unable to auger through asphalt surface at original sample location
LH-S41-01R-SB (0.5-3′)	ISA	10/28/2013	LH-S41-01R-SB (0.5-2′)	Terminated boring at 2′ depth; collected composite subsurface soil sample from 0.5-2′ depth	Auger refusal due to concrete at 2′ depth
29SB14R-SS (0-0.5′) 29SB14R-SB (0.5-3′)	ISA	10/23/2013	NA	Moved sample location about 9′ away from original location	Unable to auger past 14″ depth at original location due to cobbles falling into borehole
01-SD09R-SB (0-0.5′) 01-SD09R-SB (0.5-3′)	ISA	10/23/2013	NA 01-SD09R-SB (0.5-1.5′)	Collected subsurface sample from second borehole located adjacent to original borehole (about 1′ away); collected subsurface sample from 0.5-1.5′ depth	Auger refusal at 1.2′ depth in first borehole, which was in marked pipeline area. Moved over 1′ and started new borehole. Auger refusal (due to gravel layer) at 1.5′ depth in second borehole.
01A-SB04-SS (0-0.5′) 01A-SB04-SB (0.5-3′)	ISA	10/23/2013	NA	Moved sample location about 11.6′ northeast of original location New Trimble location: 6961376.45/3303089.28	Original location was blocked by downed trees and dense overgrowth.
LHAAP-HB-ABERA-07SD/07SW	HB	10/24/2013	NA	Moved sample location about 26′ southwest of original location	There was no surface water at original location. Moved to location where surface water was present.
LHAAP-HB-ABERA-08SW	HB	10/24/2013	NA	Did not collect surface water sample	There was no surface water at or near the location.
LH-S71-01R-SB (0.5-3′)	ISA	10/26/2013	NA	Collected subsurface sample from second borehole located about 2.5′ east of original borehole	Auger refusal at 1.5′ depth in original borehole; collected subsurface sample from second borehole.
LH-DL74-01R-SS (0-0.5′) LH-DL74-01R-SB (0.5-3′)	ISA	10/26/2013	LH-DL74-01R-SS (0-0.4′)	Collected surface sample from 0-0.4′ depth interval	Auger refusal at 0.4′ depth in original borehole
			LH-DL74-01R-SB (0.5-2.2′)	Collected subsurface sample from second borehole located about 4′ east-northeast of original borehole	Auger refusal at 2.2′ depth in second borehole; collected composite subsurface sample from 0.5-2.2′ depth in second borehole
LH-S73-01R-SS (0-0.5′) LH-S73-01R-SB (0.5-3′)	ISA	10/26/2013	NA	Moved sample location about 14′ away from original location [direction not provided]	Original location was in middle of a concrete driveway.
LH-S27-01R-SS (0-0.5′) LH-S27-01R-SB (0.5-3′)	ISA	10/28/2013	NA	Moved sample location about 10′ north-northwest of original location	Auger refusal at 3″ depth at original location
LH-S95-01R-SS (0-0.5′) LH-S95-01R-SB (0.5-3′)	ISA	10/29/2013	NA	Moved sample location about 17′ south-southwest of original location	Concrete pavement at 2-3” depth at original location

Sub-area/watershed: ISA = Industrial Sub-Area, HB = Harrison Bayou
NA = Not applicable

APPENDIX E

Large Scale Maps of Low Impact Sub-Area Locations

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LISA-1

LISA-2

LISA-3

LISA-4

LISA-5

Legend

- Appendix E Map Extents
- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Low Impact Sub-Area
- Industrial Sub-Area
- Waste Sub-Area
- Roads
- Buildings
- Streams
- Lakes
- LHAAP Boundary

0 2,200

Feet

1 inch = 2,200 feet

Texas State Plane North Central Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX E
FIGURE 1
OVERVIEW MAP
LARGE SCALE MAPS
OF LOW IMPACT SUB-AREA
LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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LISA-1

LAP-39M1

LAP-35M2

LAP-31M1

LAP-31M2

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Low Impact Sub-Area
- Industrial Sub-Area
- Waste Sub-Area
- LHAAP Boundary

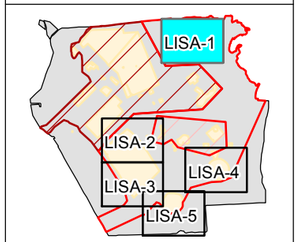
N

0 425

Feet

1 inch = 425 feet

Texas State Plane North Central FIPS 4202



U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX E - FIGURE 2
AREA LISA-1

LARGE SCALE MAPS OF LOW IMPACT SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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LISA-2

29

LAP-81105

LAP-81103

LAP-81109

45

LAP-81127

52

11SB06

11SB05

11SD13

11SB04

11

11SB03

12

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Low Impact Sub-Area
- Industrial Sub-Area
- Waste Sub-Area
- LHAAP Boundary

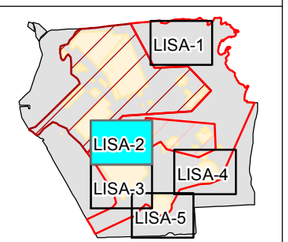
N

0 425

Feet

1 inch = 425 feet

Texas State Plane North Central Feet



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TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX E - FIGURE 3
AREA LISA-2

LARGE SCALE MAPS OF LOW IMPACT SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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LISA-3

LAP-81124
LAP-81130
LAP-81129
LAP-81158
45
LAP-81156
LAP-81155
WRSUMP13-SB01
LAP-81152
27

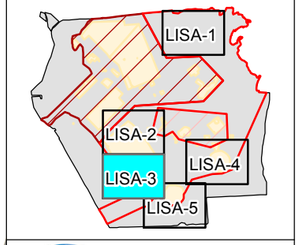
Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Low Impact Sub-Area
- Industrial Sub-Area
- Waste Sub-Area
- LHAAP Boundary

N

0 425
Feet
1 inch = 425 feet

Texas State Plane North Central Feet



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TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX E - FIGURE 4
AREA LISA-3

LARGE SCALE MAPS OF LOW IMPACT SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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LISA-4

Pistol Range

19

54

XXSD16

XXSB20

XXSB21

XXSB17

BTA-54-LHAAP-001-RS-01B

XXSB15

XXSB18

XXSB19

BTA-54-LHAAP-001-RS-01A

XXSB16

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Low Impact Sub-Area
- Industrial Sub-Area
- Waste Sub-Area
- LHAAP Boundary

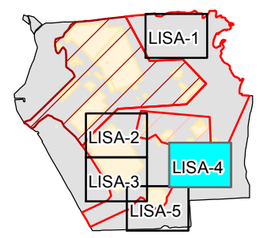
N

0 425

Feet

1 inch = 425 feet

Texas State Plane North Central Feet



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TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX E - FIGURE 5
AREA LISA-4

LARGE SCALE MAPS OF LOW IMPACT SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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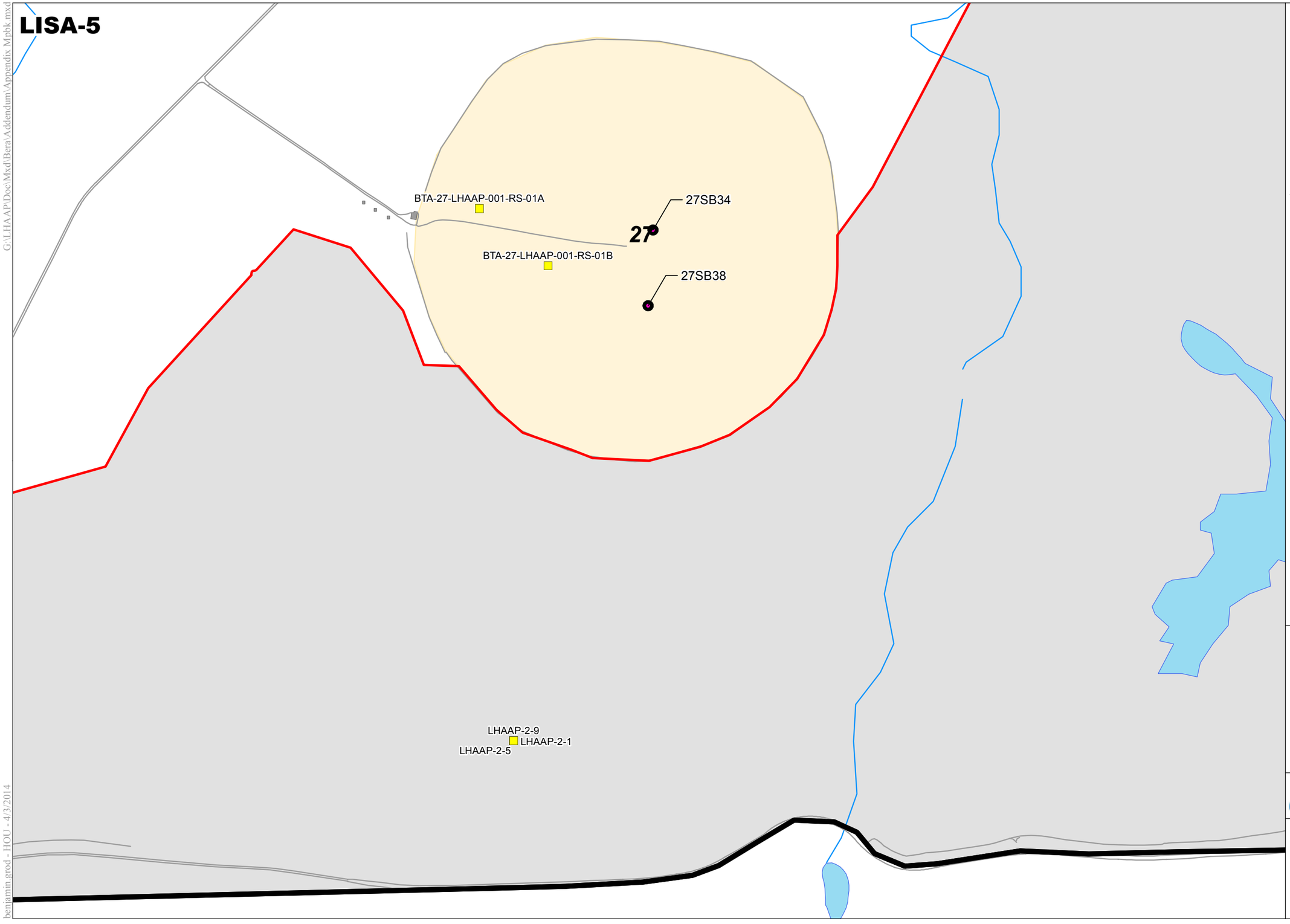
LISA-5



Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Low Impact Sub-Area
- Industrial Sub-Area
- Waste Sub-Area
- LHAAP Boundary

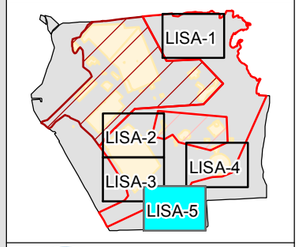
N

0 425

Feet

1 inch = 425 feet

Texas State Plane North Central Feet



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TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX E - FIGURE 6
AREA LISA-5

LARGE SCALE MAPS OF LOW IMPACT SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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APPENDIX F

Large Scale Maps of Industrial Sub-Area Locations

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ISA-1
ISA-2
ISA-3
ISA-4
ISA-5
ISA-6
ISA-7
ISA-8
ISA-9
ISA-10

Legend

- Appendix F Map Extents
- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- Roads
- Buildings
- Streams
- Lakes
- LHAAP Boundary

N

0 2,200

Feet

1 inch = 2,200 feet

Texas State Plane North Central Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F
FIGURE 1
OVERVIEW MAP
LARGE SCALE MAPS
OF INDUSTRIAL SUB-AREA
LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-1

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LH-S02-02
LH-S02-01
LHSMW21
WRSUMP005-SB01
LHSMW20
LH-S01-01
LH-S01-02
MAM-P2212-SS
MAM-P2268-SS
MAM-P2237-SS
LHSMW25
WRS021-SB01
WRS021-SB02
LHSMW19
LHSMW16
46SB01
LHSMW24
35SUMP107-SB01
35SUMP107-SB02
LH-S23-02
LHSMW22
WRS008-SB02
WRS008-SB01
LH-S10-01
LHSMW14
LHSMW15
LHSMW18
MAM-P2544-SS
35SUMP017-SB01
46
46SB03
LHSMW23
01SB29
01SD12
FWS-038
LH-S11-02
MAM-P2586-SS
LHSMW17
01A-SD03
46SB02
46SD06
01A-SB01
01SD11
MAM-P2571-SS
01MW01
01A-SB02
01SD10
LHSMW27
LHSMW26
01MW02
FWS-036
46SD05
01A-SB03
LHSMW13
01MW03
01SD09
WRS14-SB01
01SB24
35SUMP035-SB01
01SB26
01SB25
01
01SD08
35SUMP035-SB02
01MW04
01SB27
35SUMP034-SB01
46SD02
01SB22
01SD07
35SUMP034-SB02
01A-SD02
LHSMW12
LH-S40-01
01A-SD01
01SB28
LHSMW08
01A-SB04
01MW05
01SB23
46SD01
LH-S38-01
01SD06
47
LHSMW11
LHSMW09
FWS-035
LH-S110-01

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350
Feet
1 inch = 350 feet

Texas State Plane North Central Feet

ISA-1 ISA-2
ISA-3 ISA-4 ISA-5
ISA-6 ISA-7 ISA-8 ISA-9
ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 2
AREA ISA-1

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-2

FWS-229

FWS-230

46

47

MAM-W250-SS

MAM-W220-SS

FWS-231

LHSMW37

LHSMW36

LHSMW35

LH-S86-02

LHSMW38

LHSMW34

LHSMW33

LHSMW32

LHSMW31

LHSMW28

FWS-233

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350
Feet
1 inch = 350 feet

Texas State Plane North Central

ISA-1 ISA-2 ISA-3 ISA-4 ISA-5 ISA-6 ISA-7 ISA-8 ISA-9 ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 3
AREA ISA-2

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-3

LAP-023
LAP-022
LAP-021
LAP-024
LAP-025
LAP-026
LAP-027
LAP-028
LHSMW10
61
02
46
47
35ASB03
35A(58)
03
LHSMW06
60
LHSMW05
LHSMW04
LH-S119-01
LH-S119-02
68
69
35ASB05
LHSMW07
LH-S120-01
LH-S120-02
59
LHSMW03
04SB05
LH-S122-01
LH-S122-02
66
60
04SB03
LHSMW01
LHSMW02
04
04SB04
04SB06
60
60
60SB22
LHSMW51
05
FWS-029
49
49SB36
29SD24
32SS01
32SB03
32SB12
32SB07
32SB21
32SS02
32SB08
32SB13
32SB04
32SB05
32SB20
32SB06
32SB09
32SB01
32SB17
32SB22
32SB02
32SS03
32SB14
32SB10
32SB18
32SB16
32SS04
32SB19
32
29SD26
32SB23
32SD05
32SB15
32SD06
32SD07
29

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350
Feet
1 inch = 350 feet

Texas State Plane North Central

ISA-1 ISA-2
ISA-3 ISA-4 ISA-5
ISA-6 ISA-7 ISA-8 ISA-9
ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 4
AREA ISA-3

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-4

LHSMW29
LHSMW30
LHSMW44
LHSMW41
LHSMW39
FWS-234
LH-DL072-01
06SB03
06SB02
06SB01
06
LHSMW40
MAM-GP150-SS
LH-S072-02
LH-S072-01
LHSMW45
51
07
LHSMW42
47SB01
47SB02
LHSMW43
LH-DL065-01
LH-S065-01
LH-S065-02
LHSMW46
FWS-196
LH-DL064-01
LH-S064-01
LH-S064-02
LHSMW47
LH-S062-01
LH-DL063-01
LH-S063-01
LHSMW49
47
LHSMW57
LHSMW48
LHSMW55
LHSMW56
LHSMW50
47SB03
LH-DL52-01
LH-S52-01
LHSMW54
FWS-195
FWS-194
FWS-193
LHSMW52
LHSMW58
35BSB01
35B(37)
WRS019-SB01
LHSMW53
LHSMW60
08SB03
08SB01
08SB05
08
08SB04
50SB06
50
50SS07

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350
Feet
1 inch = 350 feet

Texas State Plane North Central

ISA-1 ISA-2 ISA-3 ISA-4 ISA-5 ISA-6 ISA-7 ISA-8 ISA-9 ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 5
AREA ISA-4

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-5

FWS-191

FWS-189

FWS-190

LHSMW66

LHSMW65

FWS-178

LHSMW63

48SB01

LHSMW64

48

LHSMW62

FWS-176

FWS-167

FWS-168

FWS-192

LHSMW61

FWS-177

FWS-133

FWS-134

FWS-132

FWS-166

FWS-165

LHSMW71

FWS-164

LHSMW70

FWS-161

FWS-160

35C(53)

FWS-130

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350
Feet
1 inch = 350 feet

Texas State Plane North Central FIPS

ISA-1 ISA-2
ISA-3 ISA-4 ISA-5
ISA-6 ISA-7 ISA-8 ISA-9
ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 6
AREA ISA-5

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-6

FWS-022

CCSD01

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

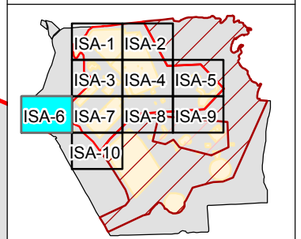
N

0 350

Feet

1 inch = 350 feet

Texas State Plane North Central



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TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 7
AREA ISA-6

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-7

49SB35

49

49SB34

FWS-026

FWS-025

32

32SB11

32SD17

32SD18

29SB13

29SS05

29SB12

29SB14

29SS04

29SB15

29SS03

23

29SS08

29

64

29SS07

29SD10

29WL02

29SS06

FWS-021

29SB04

29SS02

29SB01

29SB03

29SB05

29SB02

29SB06

29SD01

29SB07

29SS01

29SB08

29SB09

29SB10

29SB11

FWS-221

34

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Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350

Feet

1 inch = 350 feet

Texas State Plane North Central FIPS 4202

ISA-1 ISA-2 ISA-3 ISA-4 ISA-5 ISA-6 ISA-7 ISA-8 ISA-9 ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 8
AREA ISA-7

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

ISA-8

35B(37)

50

09

67

67SB01

67SB02

67SB03

FWS-113

FWS-114

FWS-115

FWS-116

FWS-117

FWS-121

FWS-122

29

29SD11

FWS-112

FWS-222

45

12

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350

Feet

1 inch = 350 feet

Texas State Plane North Central

ISA-1 ISA-2 ISA-3 ISA-4 ISA-5 ISA-6 ISA-7 ISA-8 ISA-9 ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 9
AREA ISA-8

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-9

FWS-131
FWS-129
FWS-128
FWS-125
FWS-126

LHSMW69
LHSMW67
35CSB01
LH-S104-02
LH-S104-01
LH-S102-02
LH-S102-01
LH-S105-02
LH-S105-01
LH-S103-02
LH-S103-01
LHSMW68
35C(53)
BTA-53-LHAAP-001-RS-01A
BTA-53-LHAAP-001-RS-01B

18
24

Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350
Feet
1 inch = 350 feet

Texas State Plane North Central FIPS 4202

ISA-1 ISA-2
ISA-3 ISA-4 ISA-5
ISA-6 ISA-7 ISA-8 ISA-9
ISA-10

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 10
AREA ISA-9

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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ISA-10

35SUMP118-SB01

29

FWS-220

FWS-016

45

52

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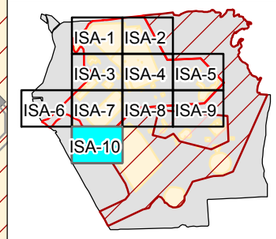
Legend

- Cape Environmental Samples 2006
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Roads
- Buildings
- Streams
- Lakes
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- LHAAP Boundary

0 350
Feet
1 inch = 350 feet

Texas State Plane North Central Feet



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TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX F - FIGURE 11
AREA ISA-10

LARGE SCALE MAPS OF INDUSTRIAL SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

APPENDIX G

Large Scale Maps of Waste Sub-Area Locations

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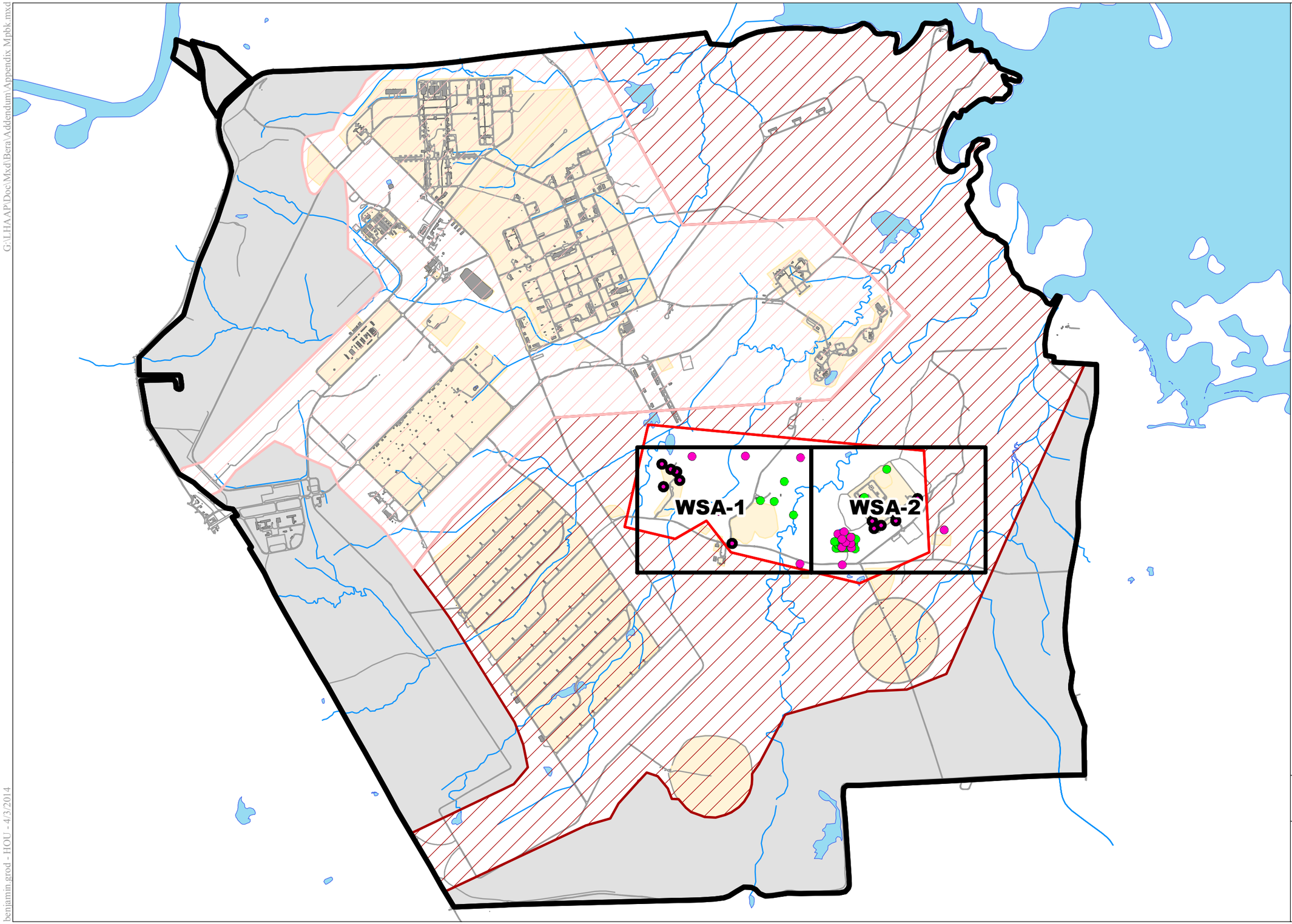

Legend

- Appendix G Map Extents
- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Waste Sub-Area
- Industrial Sub-Area
- Low Impact Sub-Area
- Roads
- Buildings
- Streams
- Lakes
- LHAAP Boundary

0 2,200
Feet
1 inch = 2,200 feet

Texas State Plane North Central Feet

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX G
FIGURE 1
OVERVIEW MAP
LARGE SCALE MAPS
OF WASTE SUB-AREA
LOCATIONS
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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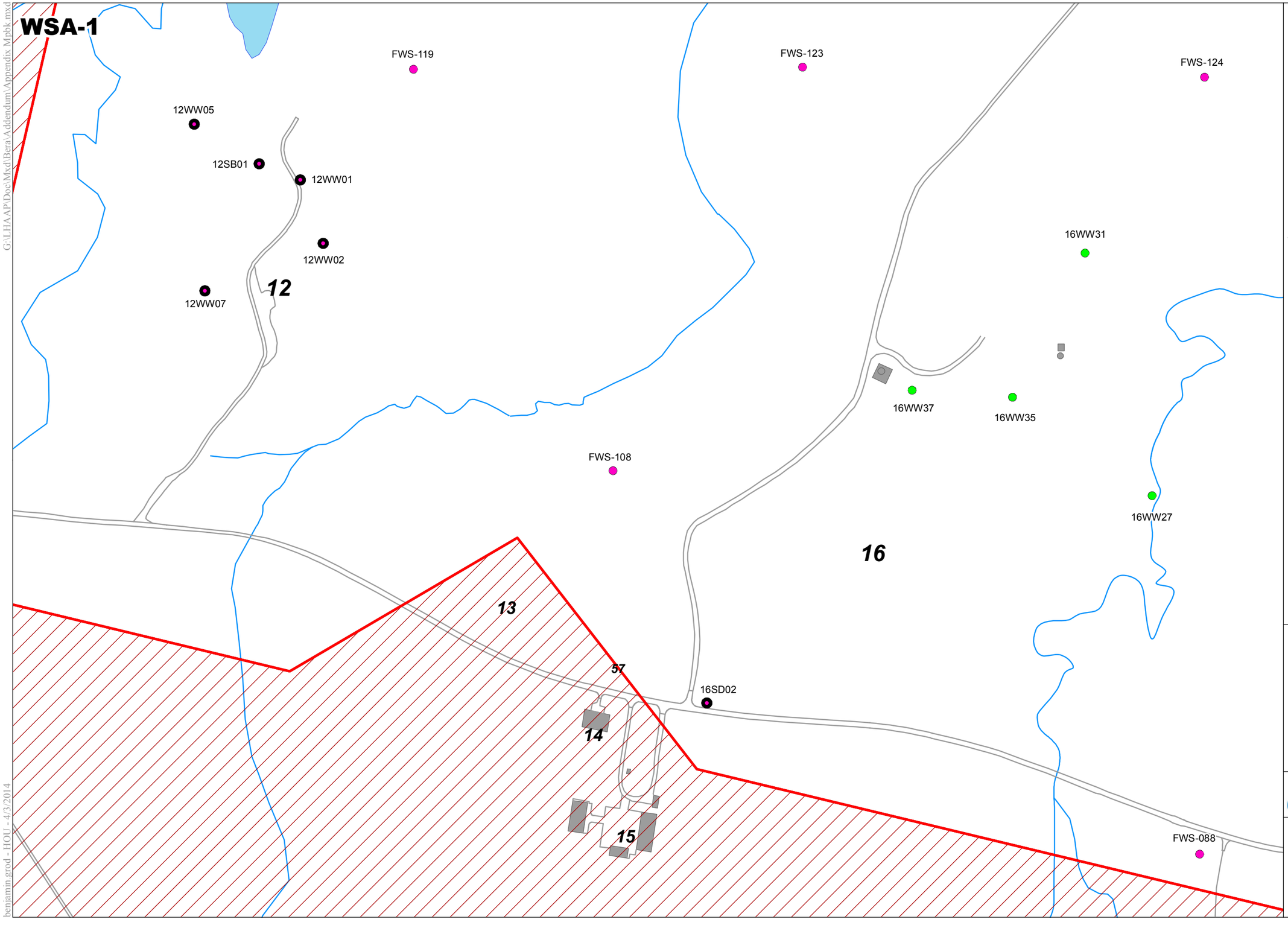


Legend

- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Waste Sub-Area
- Industrial Sub-Area
- Low Impact Sub-Area
- Roads
- Buildings
- Streams
- Lakes
- LHAAP Boundary

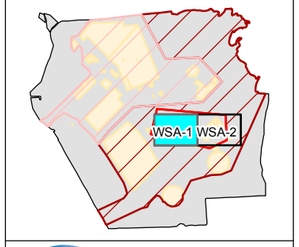
N

0 300

Feet

1 inch = 300 feet

Texas State Plane North Central Feet



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TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX G - FIGURE 2
AREA WSA-1

LARGE SCALE MAPS OF WASTE SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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WSA-2

18SD29

24

35SUMP115-SB01
LH-S115-01
LH-S115-02

18

18SD03

18SD04

LH-S114-01
LH-S114-02
35SUMP114-SB01

18SD05

19

18SD08

18SD06

18SD07

17SD01
17SS25
17SS23
17SD02
17SD11
17SB03
17SS29
17SS22
17SB02
17SS21
17SS24
17SS28
17SS27
17SD12
17WW01
COE17-02
COE17-03
COE17-04
COE17-09
COE17-10
COE17-11
17SB05
COE17-12
COE17-13
COE17-05
COE17-14
COE17-15
17SB06
17SS31
COE17-16
COE17-06
COE17-07
COE17-08
17SB04
17SD10
17SB01
17SS26

17

17SB07

FWS-101

63

19

Legend

- 2013 Explosives Sample Location
- Post-BERA and Non-ITS explosives sample.
- 2,4-DNT and 2,6-DNT (SVOC) data available for this sample.
- Waste Sub-Area
- Industrial Sub-Area
- Low Impact Sub-Area
- Roads
- Buildings
- Streams
- Lakes
- LHAAP Boundary

N

0 300
Feet
1 inch = 300 feet

Texas State Plane North Central Feet

WSA-1 WSA-2

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

APPENDIX G - FIGURE 3
AREA WSA-2

LARGE SCALE MAPS OF WASTE SUB-AREA LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

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APPENDIX H

ProUCL Output for the ISA and WSA Revised Soil Datasets

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

INDUSTRIAL SUB-AREA REVISED BERA DATASET PROUCL OUTPUT

User Selected Options	
Date/Time of Computation	1/27/2014 4:52:55 PM
From File	LHAAP ISA ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,3,5-Trinitrobenzene

General Statistics

Total Number of Observations	321	Number of Distinct Observations	50
Number of Detects	4	Number of Non-Detects	317
Number of Distinct Detects	4	Number of Distinct Non-Detects	46
Minimum Detect	0.341	Minimum Non-Detect	0.15
Maximum Detect	28.5	Maximum Non-Detect	0.258
Variance Detects	174.8	Percent Non-Detects	98.75%
Mean Detects	9.37	SD Detects	13.22
Median Detects	4.32	CV Detects	1.411
Skewness Detects	1.621	Kurtosis Detects	2.451
Mean of Logged Detects	1.007	SD of Logged Detects	2.058

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.806	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.443	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.265	Standard Error of Mean	0.105
SD	1.637	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.439	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.438	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.581	95% KM Chebyshev UCL	0.725
97.5% KM Chebyshev UCL	0.924	99% KM Chebyshev UCL	1.315

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.318	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.68	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.287	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.41	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

k hat (MLE)	0.514	k star (bias corrected MLE)	0.295
Theta hat (MLE)	18.23	Theta star (bias corrected MLE)	31.75
nu hat (MLE)	4.111	nu star (bias corrected)	2.361
MLE Mean (bias corrected)	9.37	MLE Sd (bias corrected)	17.25

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0262	nu hat (KM)	16.81
Approximate Chi Square Value (16.81, α)	8.539	Adjusted Chi Square Value (16.81, β)	8.512
95% Gamma Approximate KM-UCL (use when n>=50)	0.522	95% Gamma Adjusted KM-UCL (use when n<50)	0.523

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.127
Maximum	28.5	Median	0.01
SD	1.649	CV	13.02
k hat (MLE)	0.282	k star (bias corrected MLE)	0.282
Theta hat (MLE)	0.449	Theta star (bias corrected MLE)	0.45
nu hat (MLE)	181.1	nu star (bias corrected)	180.8
MLE Mean (bias corrected)	0.127	MLE Sd (bias corrected)	0.239
		Adjusted Level of Significance (β)	0.0493
Approximate Chi Square Value (180.76, α)	150.7	Adjusted Chi Square Value (180.76, β)	150.5
95% Gamma Approximate UCL (use when n>=50)	0.152	95% Gamma Adjusted UCL (use when n<50)	N/A

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.443	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.117	Mean in Log Scale	-23.37
SD in Original Scale	1.65	SD in Log Scale	7.86
95% t UCL (assumes normality of ROS data)	0.269	95% Percentile Bootstrap UCL	0.281
95% BCA Bootstrap UCL	0.433	95% Bootstrap t UCL	5.819
95% H-UCL (Log ROS)	175866		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.861	95% H-UCL (KM -Log)	0.173
KM SD (logged)	0.379	95% Critical H Value (KM-Log)	1.739

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

KM Standard Error of Mean (logged)	0.0244

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.225	Mean in Log Scale	-2.186
SD in Original Scale	1.642	SD in Log Scale	0.449
95% t UCL (Assumes normality)	0.376	95% H-Stat UCL	0.13

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.439	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1,3-Dinitrobenzene

General Statistics

Total Number of Observations	321	Number of Distinct Observations	56
Number of Detects	2	Number of Non-Detects	319
Number of Distinct Detects	2	Number of Distinct Non-Detects	54
Minimum Detect	0.83	Minimum Non-Detect	0.05
Maximum Detect	6.13	Maximum Non-Detect	0.258
Variance Detects	14.05	Percent Non-Detects	99.38%
Mean Detects	3.48	SD Detects	3.748
Median Detects	3.48	CV Detects	1.077
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.813	SD of Logged Detects	1.414

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0714	Standard Error of Mean	0.027

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

SD	0.341	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.116	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.116	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.152	95% KM Chebyshev UCL	0.189
97.5% KM Chebyshev UCL	0.24	99% KM Chebyshev UCL	0.34

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.294	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.688	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	5.178	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0437	nu hat (KM)	28.05
		Adjusted Level of Significance (β)	0.0493
Approximate Chi Square Value (28.05, α)	16.96	Adjusted Chi Square Value (28.05, β)	16.93
95% Gamma Approximate KM-UCL (use when n>=50)	0.118	95% Gamma Adjusted KM-UCL (use when n<50)	0.118

Gamma (KM) may not be used when k hat (KM) is < 0.1

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0217	Mean in Log Scale	-23.39
SD in Original Scale	0.345	SD in Log Scale	6.924
95% t UCL (assumes normality of ROS data)	0.0535	95% Percentile Bootstrap UCL	0.0599
95% BCA Bootstrap UCL	0.0981	95% Bootstrap t UCL	293.5
95% H-UCL (Log ROS)	62.12		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.118	Mean in Log Scale	-2.451
SD in Original Scale	0.341	SD in Log Scale	0.665
95% t UCL (Assumes normality)	0.15	95% H-Stat UCL	0.115

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL N/A

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,4,6-Trinitrotoluene

General Statistics

Total Number of Observations	321	Number of Distinct Observations	52
Number of Detects	6	Number of Non-Detects	315
Number of Distinct Detects	6	Number of Distinct Non-Detects	46
Minimum Detect	3.9	Minimum Non-Detect	0.1
Maximum Detect	57000	Maximum Non-Detect	0.258
Variance Detects	5.403E+8	Percent Non-Detects	98.13%
Mean Detects	9551	SD Detects	23245
Median Detects	45.5	CV Detects	2.434
Skewness Detects	2.449	Kurtosis Detects	6
Mean of Logged Detects	4.651	SD of Logged Detects	3.351

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.499	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.49	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.362	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	178.6	Standard Error of Mean	194.2
SD	3176	95% KM (BCA) UCL	534
95% KM (t) UCL	499	95% KM (Percentile Bootstrap) UCL	533.6
95% KM (z) UCL	498.1	95% KM Bootstrap t UCL	125328
90% KM Chebyshev UCL	761.3	95% KM Chebyshev UCL	1025
97.5% KM Chebyshev UCL	1391	99% KM Chebyshev UCL	2111

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.047	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.831	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.417	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.368	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

k hat (MLE)	0.168	k star (bias corrected MLE)	0.195
Theta hat (MLE)	57005	Theta star (bias corrected MLE)	49008
nu hat (MLE)	2.011	nu star (bias corrected)	2.339
MLE Mean (bias corrected)	9551	MLE Sd (bias corrected)	21635

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.00316	nu hat (KM)	2.03
Approximate Chi Square Value (2.03, α)	0.155	Adjusted Chi Square Value (2.03, β)	0.154
95% Gamma Approximate KM-UCL (use when n>=50)	2343	95% Gamma Adjusted KM-UCL (use when n<50)	2362

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	178.5
Maximum	57000	Median	0.01
SD	3181	CV	17.82
k hat (MLE)	0.086	k star (bias corrected MLE)	0.0873
Theta hat (MLE)	2076	Theta star (bias corrected MLE)	2045
nu hat (MLE)	55.22	nu star (bias corrected)	56.04
MLE Mean (bias corrected)	178.5	MLE Sd (bias corrected)	604.3
		Adjusted Level of Significance (β)	0.0493
Approximate Chi Square Value (56.04, α)	39.83	Adjusted Chi Square Value (56.04, β)	39.77
95% Gamma Approximate UCL (use when n>=50)	251.2	95% Gamma Adjusted UCL (use when n<50)	251.5

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.847	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.264	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	178.5	Mean in Log Scale	-27.55
SD in Original Scale	3181	SD in Log Scale	10.91
95% t UCL (assumes normality of ROS data)	471.4	95% Percentile Bootstrap UCL	533.6
95% BCA Bootstrap UCL	888.8	95% Bootstrap t UCL	160070
95% H-UCL (Log ROS)	N/A		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.173	95% H-UCL (KM -Log)	0.219
KM SD (logged)	1.03	95% Critical H Value (KM-Log)	2.145

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

KM Standard Error of Mean (logged)	0.063

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	178.6	Mean in Log Scale	-2.162
SD in Original Scale	3181	SD in Log Scale	1.079
95% t UCL (Assumes normality)	471.5	95% H-Stat UCL	0.235

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	1391

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,4-Dinitrotoluene

General Statistics

Total Number of Observations	617	Number of Distinct Observations	157
Number of Detects	3	Number of Non-Detects	614
Number of Distinct Detects	3	Number of Distinct Non-Detects	154
Minimum Detect	1.2	Minimum Non-Detect	0.0261
Maximum Detect	82.1	Maximum Non-Detect	3.46
Variance Detects	2023	Percent Non-Detects	99.51%
Mean Detects	30.3	SD Detects	44.97
Median Detects	7.6	CV Detects	1.484
Skewness Detects	1.693	Kurtosis Detects	N/A
Mean of Logged Detects	2.206	SD of Logged Detects	2.118

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.809	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.173	Standard Error of Mean	0.163
SD	3.315	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.443	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.442	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.664	95% KM Chebyshev UCL	0.886
97.5% KM Chebyshev UCL	1.194	99% KM Chebyshev UCL	1.8

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.523	k star (bias corrected MLE)	N/A
Theta hat (MLE)	57.89	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.14	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.00273	nu hat (KM)	3.373
		Adjusted Level of Significance (β)	0.0496
Approximate Chi Square Value (3.37, α)	0.491	Adjusted Chi Square Value (3.37, β)	0.489
95% Gamma Approximate KM-UCL (use when n>=50)	1.191	95% Gamma Adjusted KM-UCL (use when n<50)	1.196

Gamma (KM) may not be used when k hat (KM) is < 0.1

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.995	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.2	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.147	Mean in Log Scale	-26.43
SD in Original Scale	3.319	SD in Log Scale	7.596
95% t UCL (assumes normality of ROS data)	0.367	95% Percentile Bootstrap UCL	0.412
95% BCA Bootstrap UCL	0.667	95% Bootstrap t UCL	10.14
95% H-UCL (Log ROS)	219.2		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.617	95% H-UCL (KM -Log)	0.0303
KM SD (logged)	0.425	95% Critical H Value (KM-Log)	1.744
KM Standard Error of Mean (logged)	0.021		

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.292	Mean in Log Scale	-2.152
SD in Original Scale	3.316	SD in Log Scale	0.796
95% t UCL (Assumes normality)	0.512	95% H-Stat UCL	0.17

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.443	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,6-Dinitrotoluene

General Statistics

Total Number of Observations	614	Number of Distinct Observations	169
Number of Detects	8	Number of Non-Detects	606
Number of Distinct Detects	8	Number of Distinct Non-Detects	162
Minimum Detect	0.109	Minimum Non-Detect	0.0261
Maximum Detect	0.73	Maximum Non-Detect	3.46
Variance Detects	0.0441	Percent Non-Detects	98.7%
Mean Detects	0.213	SD Detects	0.21
Median Detects	0.137	CV Detects	0.986
Skewness Detects	2.765	Kurtosis Detects	7.724
Mean of Logged Detects	-1.775	SD of Logged Detects	0.611

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.519	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.436	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.313	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0335	Standard Error of Mean	0.00277
SD	0.0388	95% KM (BCA) UCL	0.0398
95% KM (t) UCL	0.0381	95% KM (Percentile Bootstrap) UCL	0.0386

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

95% KM (z) UCL	0.0381	95% KM Bootstrap t UCL	0.0374
90% KM Chebyshev UCL	0.0418	95% KM Chebyshev UCL	0.0456
97.5% KM Chebyshev UCL	0.0508	99% KM Chebyshev UCL	0.0611

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.528	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.723	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.383	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.297	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.334	k star (bias corrected MLE)	1.542
Theta hat (MLE)	0.0913	Theta star (bias corrected MLE)	0.138
nu hat (MLE)	37.34	nu star (bias corrected)	24.67
MLE Mean (bias corrected)	0.213	MLE Sd (bias corrected)	0.172

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.747	nu hat (KM)	917.7
Approximate Chi Square Value (917.68, α)	848.4	Adjusted Chi Square Value (917.68, β)	848.2
95% Gamma Approximate KM-UCL (use when n>=50)	0.0363	95% Gamma Adjusted KM-UCL (use when n<50)	0.0363

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0136
Maximum	0.73	Median	0.01
SD	0.0341	CV	2.514
k hat (MLE)	2.171	k star (bias corrected MLE)	2.161
Theta hat (MLE)	0.00625	Theta star (bias corrected MLE)	0.00628
nu hat (MLE)	2666	nu star (bias corrected)	2654
MLE Mean (bias corrected)	0.0136	MLE Sd (bias corrected)	0.00923
		Adjusted Level of Significance (β)	0.0496
Approximate Chi Square Value (N/A, α)	2535	Adjusted Chi Square Value (N/A, β)	2535
95% Gamma Approximate UCL (use when n>=50)	0.0142	95% Gamma Adjusted UCL (use when n<50)	0.0142

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.664	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.313	Detected Data Not Lognormal at 5% Significance Level

Detected Data Not Lognormal at 5% Significance Level

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0236	Mean in Log Scale	-4.137
SD in Original Scale	0.0366	SD in Log Scale	0.837
95% t UCL (assumes normality of ROS data)	0.0261	95% Percentile Bootstrap UCL	0.0263
95% BCA Bootstrap UCL	0.0269	95% Bootstrap t UCL	0.0273
95% H-UCL (Log ROS)	0.0242		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.145	Mean in Log Scale	-2.186
SD in Original Scale	0.142	SD in Log Scale	0.743
95% t UCL (Assumes normality)	0.155	95% H-Stat UCL	0.157

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0381	95% KM (% Bootstrap) UCL	0.0386

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Amino-4,6-dinitrotoluene

General Statistics

Total Number of Observations	321	Number of Distinct Observations	58
Number of Detects	2	Number of Non-Detects	319
Number of Distinct Detects	2	Number of Distinct Non-Detects	57
Minimum Detect	0.254	Minimum Non-Detect	0.05
Maximum Detect	2.6	Maximum Non-Detect	0.26
Variance Detects	2.752	Percent Non-Detects	99.38%
Mean Detects	1.427	SD Detects	1.659
Median Detects	1.427	CV Detects	1.162
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.207	SD of Logged Detects	1.645

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0586	Standard Error of Mean	0.0113
SD	0.143	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0772	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0771	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0924	95% KM Chebyshev UCL	0.108
97.5% KM Chebyshev UCL	0.129	99% KM Chebyshev UCL	0.171

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	1.023	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1.396	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	4.09	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.169	nu hat (KM)	108.6
		Adjusted Level of Significance (β)	0.0493
Approximate Chi Square Value (108.56, α)	85.52	Adjusted Chi Square Value (108.56, β)	85.42
95% Gamma Approximate KM-UCL (use when n>=50)	0.0744	95% Gamma Adjusted KM-UCL (use when n<50)	0.0745

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00892	Mean in Log Scale	-17.89
SD in Original Scale	0.146	SD in Log Scale	4.939
95% t UCL (assumes normality of ROS data)	0.0223	95% Percentile Bootstrap UCL	0.0251
95% BCA Bootstrap UCL	0.0405	95% Bootstrap t UCL	15.11
95% H-UCL (Log ROS)	0.0212		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.105	Mean in Log Scale	-2.461
SD in Original Scale	0.145	SD in Log Scale	0.645
95% t UCL (Assumes normality)	0.119	95% H-Stat UCL	0.112

DL/2 is not a recommended method, provided for comparisons and historical reasons

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL 0.108

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

4-Amino-2,6-dinitrotoluene

General Statistics

Total Number of Observations	321	Number of Distinct Observations	55
Number of Detects	1	Number of Non-Detects	320
Number of Distinct Detects	1	Number of Distinct Non-Detects	54

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4-Amino-2,6-dinitrotoluene was not processed!

4-Nitrotoluene

General Statistics

Total Number of Observations	321	Number of Distinct Observations	53
Number of Detects	1	Number of Non-Detects	320
Number of Distinct Detects	1	Number of Distinct Non-Detects	52

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4-Nitrotoluene was not processed!

Nitrobenzene

General Statistics

Total Number of Observations	815	Number of Distinct Observations	192
Number of Detects	1	Number of Non-Detects	814
Number of Distinct Detects	1	Number of Distinct Non-Detects	191

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Nitrobenzene was not processed!

Tetryl

General Statistics

Total Number of Observations	275	Number of Distinct Observations	58
Number of Detects	1	Number of Non-Detects	274
Number of Distinct Detects	1	Number of Distinct Non-Detects	57

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Tetryl was not processed!

INDUSTRIAL SUB-AREA 2013 REPLACEMENT SAMPLE DATA ONLY

User Selected Options	
Date/Time of Computation	2/4/2014 9:13:20 AM
From File	ISA 2013 ProUCL input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

2,6-Dinitrotoluene

General Statistics

Total Number of Observations	170	Number of Distinct Observations	43
Number of Detects	7	Number of Non-Detects	163
Number of Distinct Detects	7	Number of Distinct Non-Detects	36
Minimum Detect	0.109	Minimum Non-Detect	0.227
Maximum Detect	0.181	Maximum Non-Detect	0.257
Variance Detects	5.9090E-4	Percent Non-Detects	95.88%
Mean Detects	0.139	SD Detects	0.0243
Median Detects	0.132	CV Detects	0.175
Skewness Detects	0.757	Kurtosis Detects	0.177
Mean of Logged Detects	-1.984	SD of Logged Detects	0.17

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.335	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.139	Standard Error of Mean	0.00919
SD	0.0225	95% KM (BCA) UCL	0.156
95% KM (t) UCL	0.154	95% KM (Percentile Bootstrap) UCL	0.155
95% KM (z) UCL	0.154	95% KM Bootstrap t UCL	0.164
90% KM Chebyshev UCL	0.167	95% KM Chebyshev UCL	0.179
97.5% KM Chebyshev UCL	0.197	99% KM Chebyshev UCL	0.231

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.225	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.707	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.183	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.311	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	39.88	k star (bias corrected MLE)	22.89
Theta hat (MLE)	0.00349	Theta star (bias corrected MLE)	0.00609
nu hat (MLE)	558.4	nu star (bias corrected)	320.4
MLE Mean (bias corrected)	0.139	MLE Sd (bias corrected)	0.0291

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	38.3	nu hat (KM)	13023
Approximate Chi Square Value (N/A, α)	12759	Adjusted Chi Square Value (N/A, β)	12757
95% Gamma Approximate KM-UCL (use when n>=50)	0.142	95% Gamma Adjusted KM-UCL (use when n<50)	0.142

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0978	Mean	0.139
Maximum	0.186	Median	0.138
SD	0.0211	CV	0.151
k hat (MLE)	43.64	k star (bias corrected MLE)	42.88
Theta hat (MLE)	0.00319	Theta star (bias corrected MLE)	0.00325
nu hat (MLE)	14839	nu star (bias corrected)	14579
MLE Mean (bias corrected)	0.139	MLE Sd (bias corrected)	0.0213
		Adjusted Level of Significance (β)	0.0486

Table H-1
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Industrial Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Approximate Chi Square Value (N/A, α)	14299	Adjusted Chi Square Value (N/A, β)	14297
95% Gamma Approximate UCL (use when n>=50)	0.142	95% Gamma Adjusted UCL (use when n<50)	0.142

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.335	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.139	Mean in Log Scale	-1.984
SD in Original Scale	0.0206	SD in Log Scale	0.148
95% t UCL (assumes normality of ROS data)	0.142	95% Percentile Bootstrap UCL	0.142
95% BCA Bootstrap UCL	0.142	95% Bootstrap t UCL	0.142
95% H-UCL (Log ROS)	0.142		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.984	95% H-UCL (KM -Log)	0.142
KM SD (logged)	0.157	95% Critical H Value (KM-Log)	1.677
KM Standard Error of Mean (logged)	0.0643		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.121	Mean in Log Scale	-2.111
SD in Original Scale	0.00693	SD in Log Scale	0.0512
95% t UCL (Assumes normality)	0.122	95% H-Stat UCL	N/A

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.154	95% KM (Percentile Bootstrap) UCL	0.155

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

WASTE SUB-AREA REVISED BERA DATASET PROUCL OUTPUT

User Selected Options	
Date/Time of Computation	1/28/2014 9:53:19 AM
From File	WSA ProUCL soil input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,3,5-Trinitrobenzene

General Statistics

Total Number of Observations	62	Number of Distinct Observations	23
Number of Detects	6	Number of Non-Detects	56
Number of Distinct Detects	6	Number of Distinct Non-Detects	17
Minimum Detect	0.54	Minimum Non-Detect	0.15
Maximum Detect	109	Maximum Non-Detect	0.255
Variance Detects	1979	Percent Non-Detects	90.32%
Mean Detects	34.48	SD Detects	44.49
Median Detects	13.85	CV Detects	1.29
Skewness Detects	1.225	Kurtosis Detects	0.0528
Mean of Logged Detects	2.181	SD of Logged Detects	2.272

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.802	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.338	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.362	Detected Data appear Normal at 5% Significance Level

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	3.472	Standard Error of Mean	2.254
SD	16.21	95% KM (BCA) UCL	7.615
95% KM (t) UCL	7.237	95% KM (Percentile Bootstrap) UCL	7.238
95% KM (z) UCL	7.18	95% KM Bootstrap t UCL	18.95
90% KM Chebyshev UCL	10.24	95% KM Chebyshev UCL	13.3
97.5% KM Chebyshev UCL	17.55	99% KM Chebyshev UCL	25.9

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.351	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.35	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Gamma Statistics on Detected Data Only

k hat (MLE)	0.471	k star (bias corrected MLE)	0.347
Theta hat (MLE)	73.12	Theta star (bias corrected MLE)	99.4
nu hat (MLE)	5.658	nu star (bias corrected)	4.162
MLE Mean (bias corrected)	34.48	MLE Sd (bias corrected)	58.54

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0459	nu hat (KM)	5.692
Approximate Chi Square Value (5.69, α)	1.484	Adjusted Chi Square Value (5.69, β)	1.435
95% Gamma Approximate KM-UCL (use when n>=50)	13.31	95% Gamma Adjusted KM-UCL (use when n<50)	13.78

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.345
Maximum	109	Median	0.01
SD	16.36	CV	4.891
k hat (MLE)	0.149	k star (bias corrected MLE)	0.153
Theta hat (MLE)	22.43	Theta star (bias corrected MLE)	21.91
nu hat (MLE)	18.5	nu star (bias corrected)	18.94
MLE Mean (bias corrected)	3.345	MLE Sd (bias corrected)	8.561
		Adjusted Level of Significance (β)	0.0461
Approximate Chi Square Value (18.94, α)	10.07	Adjusted Chi Square Value (18.94, β)	9.917
95% Gamma Approximate UCL (use when n>=50)	6.29	95% Gamma Adjusted UCL (use when n<50)	6.388

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.34	Mean in Log Scale	-9.474
SD in Original Scale	16.36	SD in Log Scale	5.601
95% t UCL (assumes normality of ROS data)	6.811	95% Percentile Bootstrap UCL	7.283
95% BCA Bootstrap UCL	8.845	95% Bootstrap t UCL	30.01
95% H-UCL (Log ROS)	104611		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

KM Mean (logged)	-1.502	95% H-UCL (KM -Log)	0.854
KM SD (logged)	1.367	95% Critical H Value (KM-Log)	2.342
KM Standard Error of Mean (logged)	0.19		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.428	Mean in Log Scale	-1.874
SD in Original Scale	16.35	SD in Log Scale	1.503
95% t UCL (Assumes normality)	6.896	95% H-Stat UCL	0.771

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	7.237	95% KM (Percentile Bootstrap) UCL	7.238

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1,3-Dinitrobenzene

General Statistics

Total Number of Observations	62	Number of Distinct Observations	20
Number of Detects	3	Number of Non-Detects	59
Number of Distinct Detects	3	Number of Distinct Non-Detects	17
Minimum Detect	0.42	Minimum Non-Detect	0.05
Maximum Detect	1.7	Maximum Non-Detect	0.255
Variance Detects	0.534	Percent Non-Detects	95.16%
Mean Detects	0.857	SD Detects	0.731
Median Detects	0.45	CV Detects	0.853
Skewness Detects	1.729	Kurtosis Detects	N/A
Mean of Logged Detects	-0.378	SD of Logged Detects	0.788

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.768	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.378	**Lilliefors GOF Test**	

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.089	Standard Error of Mean	0.0338
SD	0.217	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.145	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.145	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.19	95% KM Chebyshev UCL	0.236
97.5% KM Chebyshev UCL	0.3	99% KM Chebyshev UCL	0.425

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	2.388	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.359	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	14.33	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.168	nu hat (KM)	20.83
		Adjusted Level of Significance (β)	0.0461
Approximate Chi Square Value (20.83, α)	11.47	Adjusted Chi Square Value (20.83, β)	11.3
95% Gamma Approximate KM-UCL (use when n>=50)	0.162	95% Gamma Adjusted KM-UCL (use when n<50)	0.164

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.787	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.37	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0466	Mean in Log Scale	-6.733
SD in Original Scale	0.227	SD in Log Scale	2.53
95% t UCL (assumes normality of ROS data)	0.0948	95% Percentile Bootstrap UCL	0.102
95% BCA Bootstrap UCL	0.133	95% Bootstrap t UCL	0.201
95% H-UCL (Log ROS)	0.0888		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.869	95% H-UCL (KM -Log)	0.0774
KM SD (logged)	0.579	95% Critical H Value (KM-Log)	1.915
KM Standard Error of Mean (logged)	0.0901		

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.118	Mean in Log Scale	-2.654
SD in Original Scale	0.219	SD in Log Scale	0.922
95% t UCL (Assumes normality)	0.164	95% H-Stat UCL	0.14

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.145	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,4,6-Trinitrotoluene

General Statistics

Total Number of Observations	101	Number of Distinct Observations	35
Number of Detects	15	Number of Non-Detects	86
Number of Distinct Detects	14	Number of Distinct Non-Detects	21
Minimum Detect	0.206	Minimum Non-Detect	0.1
Maximum Detect	10000	Maximum Non-Detect	2.49
Variance Detects	6650386	Percent Non-Detects	85.15%
Mean Detects	678.6	SD Detects	2579
Median Detects	2.42	CV Detects	3.8
Skewness Detects	3.872	Kurtosis Detects	15
Mean of Logged Detects	1.483	SD of Logged Detects	2.832

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.29	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.521	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.229	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	100.9	Standard Error of Mean	102
SD	990	95% KM (BCA) UCL	298.7

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

95% KM (t) UCL	270.2	95% KM (Percentile Bootstrap) UCL	298.5
95% KM (z) UCL	268.6	95% KM Bootstrap t UCL	36637
90% KM Chebyshev UCL	406.8	95% KM Chebyshev UCL	545.3
97.5% KM Chebyshev UCL	737.6	99% KM Chebyshev UCL	1115

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.806	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.926	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.388	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.249	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.152	k star (bias corrected MLE)	0.166
Theta hat (MLE)	4457	Theta star (bias corrected MLE)	4082
nu hat (MLE)	4.568	nu star (bias corrected)	4.987
MLE Mean (bias corrected)	678.6	MLE Sd (bias corrected)	1664

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0104	nu hat (KM)	2.097
Approximate Chi Square Value (2.10, α)	0.165	Adjusted Chi Square Value (2.10, β)	0.16
95% Gamma Approximate KM-UCL (use when n>=50)	1286	95% Gamma Adjusted KM-UCL (use when n<50)	1321

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	100.8
Maximum	10000	Median	0.01
SD	994.9	CV	9.871
k hat (MLE)	0.0979	k star (bias corrected MLE)	0.102
Theta hat (MLE)	1029	Theta star (bias corrected MLE)	991.8
nu hat (MLE)	19.78	nu star (bias corrected)	20.53
MLE Mean (bias corrected)	100.8	MLE Sd (bias corrected)	316.2
		Adjusted Level of Significance (β)	0.0476
Approximate Chi Square Value (20.53, α)	11.24	Adjusted Chi Square Value (20.53, β)	11.14
95% Gamma Approximate UCL (use when n>=50)	184.1	95% Gamma Adjusted UCL (use when n<50)	185.7

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.874	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

5% Lilliefors Critical Value	0.229	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	100.8	Mean in Log Scale	-8.188
SD in Original Scale	994.9	SD in Log Scale	5.499
95% t UCL (assumes normality of ROS data)	265.1	95% Percentile Bootstrap UCL	297.8
95% BCA Bootstrap UCL	400.7	95% Bootstrap t UCL	39367
95% H-UCL (Log ROS)	81933		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.69	95% H-UCL (KM -Log)	1.302
KM SD (logged)	1.704	95% Critical H Value (KM-Log)	2.944
KM Standard Error of Mean (logged)	0.18		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	100.9	Mean in Log Scale	-1.718
SD in Original Scale	994.9	SD in Log Scale	1.761
95% t UCL (Assumes normality)	265.2	95% H-Stat UCL	1.438

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	737.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,4-Dinitrotoluene

General Statistics

Total Number of Observations	136	Number of Distinct Observations	58
Number of Detects	12	Number of Non-Detects	124
Number of Distinct Detects	12	Number of Distinct Non-Detects	46
Minimum Detect	0.266	Minimum Non-Detect	0.0294
Maximum Detect	7100	Maximum Non-Detect	2.49
Variance Detects	4196220	Percent Non-Detects	91.18%
Mean Detects	595.3	SD Detects	2048
Median Detects	1.325	CV Detects	3.441

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Skewness Detects	3.464	Kurtosis Detects	12
Mean of Logged Detects	1.134	SD of Logged Detects	2.798

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.329	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.528	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.256	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	52.55	Standard Error of Mean	54.32
SD	606.6	95% KM (BCA) UCL	157.1
95% KM (t) UCL	142.5	95% KM (Percentile Bootstrap) UCL	156.9
95% KM (z) UCL	141.9	95% KM Bootstrap t UCL	37334
90% KM Chebyshev UCL	215.5	95% KM Chebyshev UCL	289.3
97.5% KM Chebyshev UCL	391.8	99% KM Chebyshev UCL	593.1

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.693	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.918	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.442	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.277	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.147	k star (bias corrected MLE)	0.166
Theta hat (MLE)	4057	Theta star (bias corrected MLE)	3595
nu hat (MLE)	3.521	nu star (bias corrected)	3.974
MLE Mean (bias corrected)	595.3	MLE Sd (bias corrected)	1463

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.00751	nu hat (KM)	2.042
Approximate Chi Square Value (2.04, α)	0.156	Adjusted Chi Square Value (2.04, β)	0.153
95% Gamma Approximate KM-UCL (use when n>=50)	686.1	95% Gamma Adjusted KM-UCL (use when n<50)	699.2

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	52.53
Maximum	7100	Median	0.01

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

SD	608.8	CV	11.59
k hat (MLE)	0.101	k star (bias corrected MLE)	0.103
Theta hat (MLE)	521.8	Theta star (bias corrected MLE)	508.3
nu hat (MLE)	27.38	nu star (bias corrected)	28.11
MLE Mean (bias corrected)	52.53	MLE Sd (bias corrected)	163.4
		Adjusted Level of Significance (β)	0.0482
Approximate Chi Square Value (28.11, α)	17.02	Adjusted Chi Square Value (28.11, β)	16.92
95% Gamma Approximate UCL (use when n>=50)	86.79	95% Gamma Adjusted UCL (use when n<50)	87.27

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.767	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.256	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	52.52	Mean in Log Scale	-11.59
SD in Original Scale	608.8	SD in Log Scale	5.644
95% t UCL (assumes normality of ROS data)	139	95% Percentile Bootstrap UCL	156.9
95% BCA Bootstrap UCL	261.1	95% Bootstrap t UCL	28069
95% H-UCL (Log ROS)	3895		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.105	95% H-UCL (KM -Log)	0.215
KM SD (logged)	1.549	95% Critical H Value (KM-Log)	2.752
KM Standard Error of Mean (logged)	0.14		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	52.65	Mean in Log Scale	-1.914
SD in Original Scale	608.8	SD in Log Scale	1.411
95% t UCL (Assumes normality)	139.1	95% H-Stat UCL	0.547

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL 391.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,6-Dinitrotoluene

General Statistics

Total Number of Observations	136	Number of Distinct Observations	63
Number of Detects	15	Number of Non-Detects	121
Number of Distinct Detects	15	Number of Distinct Non-Detects	48
Minimum Detect	0.107	Minimum Non-Detect	0.0294
Maximum Detect	760	Maximum Non-Detect	2.49
Variance Detects	38036	Percent Non-Detects	88.97%
Mean Detects	55.53	SD Detects	195
Median Detects	1.8	CV Detects	3.512
Skewness Detects	3.863	Kurtosis Detects	14.95
Mean of Logged Detects	0.935	SD of Logged Detects	2.274

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.311	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.491	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	6.157	Standard Error of Mean	5.764
SD	64.94	95% KM (BCA) UCL	17.53
95% KM (t) UCL	15.7	95% KM (Percentile Bootstrap) UCL	17.28
95% KM (z) UCL	15.64	95% KM Bootstrap t UCL	242.9
90% KM Chebyshev UCL	23.45	95% KM Chebyshev UCL	31.28
97.5% KM Chebyshev UCL	42.16	99% KM Chebyshev UCL	63.51

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.013	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.867	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.288	**Kolmogrov-Smirnoff GOF**
5% K-S Critical Value	0.243	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.233	k star (bias corrected MLE)	0.231
Theta hat (MLE)	238.2	Theta star (bias corrected MLE)	240.5
nu hat (MLE)	6.993	nu star (bias corrected)	6.928
MLE Mean (bias corrected)	55.53	MLE Sd (bias corrected)	115.5

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.00899	nu hat (KM)	2.445
Approximate Chi Square Value (2.44, α)	0.229	Adjusted Chi Square Value (2.44, β)	0.224
95% Gamma Approximate KM-UCL (use when n>=50)	65.75	95% Gamma Adjusted KM-UCL (use when n<50)	67.28

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.133
Maximum	760	Median	0.01
SD	65.19	CV	10.63
k hat (MLE)	0.134	k star (bias corrected MLE)	0.136
Theta hat (MLE)	45.63	Theta star (bias corrected MLE)	44.98
nu hat (MLE)	36.56	nu star (bias corrected)	37.09
MLE Mean (bias corrected)	6.133	MLE Sd (bias corrected)	16.61
		Adjusted Level of Significance (β)	0.0482
Approximate Chi Square Value (37.09, α)	24.15	Adjusted Chi Square Value (37.09, β)	24.04
95% Gamma Approximate UCL (use when n>=50)	9.42	95% Gamma Adjusted UCL (use when n<50)	9.464

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.105	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.229	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.126	Mean in Log Scale	-8.411
SD in Original Scale	65.19	SD in Log Scale	4.464
95% t UCL (assumes normality of ROS data)	15.38	95% Percentile Bootstrap UCL	17.31
95% BCA Bootstrap UCL	23.54	95% Bootstrap t UCL	259.2
95% H-UCL (Log ROS)	57.06		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.96	95% H-UCL (KM -Log)	0.271
KM SD (logged)	1.594	95% Critical H Value (KM-Log)	2.8
KM Standard Error of Mean (logged)	0.152		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	6.252	Mean in Log Scale	-1.863

SD in Original Scale	65.17	SD in Log Scale	1.4
95% t UCL (Assumes normality)	15.51	95% H-Stat UCL	0.565

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	42.16

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Amino-4,6-dinitrotoluene

General Statistics

Total Number of Observations	62	Number of Distinct Observations	22
Number of Detects	3	Number of Non-Detects	59
Number of Distinct Detects	3	Number of Distinct Non-Detects	19
Minimum Detect	0.268	Minimum Non-Detect	0.05
Maximum Detect	0.64	Maximum Non-Detect	0.259
Variance Detects	0.0372	Percent Non-Detects	95.16%
Mean Detects	0.483	SD Detects	0.193
Median Detects	0.54	CV Detects	0.4
Skewness Detects	-1.223	Kurtosis Detects	N/A
Mean of Logged Detects	-0.794	SD of Logged Detects	0.462

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.284	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0709	Standard Error of Mean	0.0154
SD	0.0991	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0967	95% KM (Percentile Bootstrap) UCL	N/A

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

95% KM (z) UCL	0.0963	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.117	95% KM Chebyshev UCL	0.138
97.5% KM Chebyshev UCL	0.167	99% KM Chebyshev UCL	0.224

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	7.864	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0614	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	47.18	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.513	nu hat (KM)	63.57
		Adjusted Level of Significance (β)	0.0461
Approximate Chi Square Value (63.57, α)	46.23	Adjusted Chi Square Value (63.57, β)	45.88
95% Gamma Approximate KM-UCL (use when n>=50)	0.0975	95% Gamma Adjusted KM-UCL (use when n<50)	0.0983

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.316	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0424	Mean in Log Scale	-4.342
SD in Original Scale	0.109	SD in Log Scale	1.393
95% t UCL (assumes normality of ROS data)	0.0655	95% Percentile Bootstrap UCL	0.0656
95% BCA Bootstrap UCL	0.0735	95% Bootstrap t UCL	0.103
95% H-UCL (Log ROS)	0.0524		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.889	95% H-UCL (KM -Log)	0.0699
KM SD (logged)	0.48	95% Critical H Value (KM-Log)	1.849
KM Standard Error of Mean (logged)	0.0746		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.102	Mean in Log Scale	-2.626
SD in Original Scale	0.103	SD in Log Scale	0.851
95% t UCL (Assumes normality)	0.124	95% H-Stat UCL	0.131

DL/2 is not a recommended method, provided for comparisons and historical reasons

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0967	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

4-Amino-2,6-dinitrotoluene

General Statistics

Total Number of Observations	62	Number of Distinct Observations	22
Number of Detects	3	Number of Non-Detects	59
Number of Distinct Detects	3	Number of Distinct Non-Detects	19
Minimum Detect	0.268	Minimum Non-Detect	0.05
Maximum Detect	0.64	Maximum Non-Detect	0.259
Variance Detects	0.0357	Percent Non-Detects	95.16%
Mean Detects	0.473	SD Detects	0.189
Median Detects	0.51	CV Detects	0.4
Skewness Detects	-0.857	Kurtosis Detects	N/A
Mean of Logged Detects	-0.813	SD of Logged Detects	0.453

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.97	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.245	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0704	Standard Error of Mean	0.0151
SD	0.0968	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0956	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0952	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.116	95% KM Chebyshev UCL	0.136

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

97.5% KM Chebyshev UCL	0.164	99% KM Chebyshev UCL	0.22

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	8.095	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0584	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	48.57	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.529	nu hat (KM)	65.65
		Adjusted Level of Significance (β)	0.0461
Approximate Chi Square Value (65.65, α)	48.01	Adjusted Chi Square Value (65.65, β)	47.65
95% Gamma Approximate KM-UCL (use when n>=50)	0.0963	95% Gamma Adjusted KM-UCL (use when n<50)	0.0971

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.288	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0411	Mean in Log Scale	-4.397
SD in Original Scale	0.107	SD in Log Scale	1.407
95% t UCL (assumes normality of ROS data)	0.0637	95% Percentile Bootstrap UCL	0.0658
95% BCA Bootstrap UCL	0.0748	95% Bootstrap t UCL	0.0994
95% H-UCL (Log ROS)	0.0509		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.89	95% H-UCL (KM -Log)	0.0696
KM SD (logged)	0.475	95% Critical H Value (KM-Log)	1.847
KM Standard Error of Mean (logged)	0.0739		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.102	Mean in Log Scale	-2.626
SD in Original Scale	0.101	SD in Log Scale	0.849
95% t UCL (Assumes normality)	0.123	95% H-Stat UCL	0.131

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0956	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

HMX

General Statistics

Total Number of Observations	62	Number of Distinct Observations	25
Number of Detects	7	Number of Non-Detects	55
Number of Distinct Detects	7	Number of Distinct Non-Detects	18
Minimum Detect	0.288	Minimum Non-Detect	0.1
Maximum Detect	12	Maximum Non-Detect	2.19
Variance Detects	21.2	Percent Non-Detects	88.71%
Mean Detects	4.1	SD Detects	4.604
Median Detects	1.3	CV Detects	1.123
Skewness Detects	0.989	Kurtosis Detects	-0.468
Mean of Logged Detects	0.655	SD of Logged Detects	1.439

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.83	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.335	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.554	Standard Error of Mean	0.262
SD	1.911	95% KM (BCA) UCL	0.988
95% KM (t) UCL	0.992	95% KM (Percentile Bootstrap) UCL	0.988
95% KM (z) UCL	0.986	95% KM Bootstrap t UCL	1.413
90% KM Chebyshev UCL	1.341	95% KM Chebyshev UCL	1.698
97.5% KM Chebyshev UCL	2.192	99% KM Chebyshev UCL	3.164

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.409	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.247	**Kolmogrov-Smirnoff GOF**	

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

5% K-S Critical Value	0.322	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.786	k star (bias corrected MLE)	0.545
Theta hat (MLE)	5.213	Theta star (bias corrected MLE)	7.527
nu hat (MLE)	11.01	nu star (bias corrected)	7.625
MLE Mean (bias corrected)	4.1	MLE Sd (bias corrected)	5.555

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0841	nu hat (KM)	10.43
Approximate Chi Square Value (10.43, α)	4.214	Adjusted Chi Square Value (10.43, β)	4.12
95% Gamma Approximate KM-UCL (use when n>=50)	1.373	95% Gamma Adjusted KM-UCL (use when n<50)	1.404

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.472
Maximum	12	Median	0.01
SD	1.946	CV	4.126
k hat (MLE)	0.222	k star (bias corrected MLE)	0.222
Theta hat (MLE)	2.124	Theta star (bias corrected MLE)	2.124
nu hat (MLE)	27.53	nu star (bias corrected)	27.54
MLE Mean (bias corrected)	0.472	MLE Sd (bias corrected)	1.001
		Adjusted Level of Significance (β)	0.0461
Approximate Chi Square Value (27.54, α)	16.57	Adjusted Chi Square Value (27.54, β)	16.36
95% Gamma Approximate UCL (use when n>=50)	0.784	95% Gamma Adjusted UCL (use when n<50)	0.794

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.924	**Shapiro Wilk GOF Test**
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
5% Lilliefors Critical Value	0.335	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.473	Mean in Log Scale	-5.592
SD in Original Scale	1.946	SD in Log Scale	3.157
95% t UCL (assumes normality of ROS data)	0.886	95% Percentile Bootstrap UCL	0.917
95% BCA Bootstrap UCL	1.066	95% Bootstrap t UCL	1.528
95% H-UCL (Log ROS)	3.076		

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.959	95% H-UCL (KM -Log)	0.329
KM SD (logged)	1.042	95% Critical H Value (KM-Log)	2.27
KM Standard Error of Mean (logged)	0.144		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.604	Mean in Log Scale	-1.955
SD in Original Scale	1.927	SD in Log Scale	1.293
95% t UCL (Assumes normality)	1.013	95% H-Stat UCL	0.476

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.992	95% KM (Percentile Bootstrap) UCL	0.988

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

RDX

General Statistics

Total Number of Observations	62	Number of Distinct Observations	20
Number of Detects	2	Number of Non-Detects	60
Number of Distinct Detects	2	Number of Distinct Non-Detects	19
Minimum Detect	0.22	Minimum Non-Detect	0.1
Maximum Detect	0.8	Maximum Non-Detect	0.995
Variance Detects	0.168	Percent Non-Detects	96.77%
Mean Detects	0.51	SD Detects	0.41
Median Detects	0.51	CV Detects	0.804
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-0.869	SD of Logged Detects	0.913

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.115	Standard Error of Mean	0.0172
SD	0.092	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.144	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.143	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.167	95% KM Chebyshev UCL	0.19
97.5% KM Chebyshev UCL	0.222	99% KM Chebyshev UCL	0.286

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	2.715	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.188	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	10.86	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.565	nu hat (KM)	194.1
		Adjusted Level of Significance (β)	0.0461
Approximate Chi Square Value (194.11, α)	162.9	Adjusted Chi Square Value (194.11, β)	162.2
95% Gamma Approximate KM-UCL (use when n>=50)	0.137	95% Gamma Adjusted KM-UCL (use when n<50)	0.138

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0221	Mean in Log Scale	-6.162
SD in Original Scale	0.105	SD in Log Scale	1.906
95% t UCL (assumes normality of ROS data)	0.0443	95% Percentile Bootstrap UCL	0.0459
95% BCA Bootstrap UCL	0.0683	95% Bootstrap t UCL	0.2
95% H-UCL (Log ROS)	0.0269		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.138	Mean in Log Scale	-2.275
SD in Original Scale	0.135	SD in Log Scale	0.716
95% t UCL (Assumes normality)	0.167	95% H-Stat UCL	0.16

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Table H-2
General Upper Confidence Limit Statistics for Datasets with Nondetects for Soil Samples
Waste Sub-Area
Longhorn Army Ammunition Plant, Karnack, Texas

Suggested UCL to Use

95% KM (t) UCL 0.144 95% KM (% Bootstrap) UCL N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX I

Response to Comments on Draft Baseline Ecological Risk Assessment Addendum

Responses to Comments on
Baseline Ecological Risk Assessment Addendum
Longhorn Army Ammunition Plant

Date: 14 May 2014

Reviewer: Rich Mayer (EPA)
Respondent: AGEISS Team

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment No.	Reference	Comments	C, D, E or X[1]	Response
1	General	Please check Table C-1 for high detection limits in the 5 surface water data gap samples. Also, the concentration results and the detection limits are the same for all the explosive COCs in the data gap surface water samples taken in 2013. Please revise the Table to include the correct results.	C	The detection limits (also known as "reporting limits") for the 5 surface water data gaps samples presented in Table C-1 were reviewed and are accurate. All reporting limits are well below the Project Action Limits listed in the Quality Assurance Project Plan[1]. It is true that the detection limits presented in the "DETECT_LIMIT" column of Table C-1 for the data gaps samples appear to be elevated when compared with those for the historical data; however, upon further review, these historical detection limits as obtained from the historical electronic database are almost certainly method detection limits, which are typically much lower than reporting limits. Therefore, the appearance that the data gaps samples are elevated is artificial and associated with the mixture of reporting limits and method detection limits in the "DETECT_LIMIT" column.

[1] AGEISS, Inc., 2013, *Baseline Ecological Risk Assessment Addendum, Uniform Federal Policy for Quality Assurance Project Plan, Longhorn Army Ammunition Plant, Karnack, Texas,* Final, September.

Responses to Comments on
Baseline Ecological Risk Assessment Addendum
Longhorn Army Ammunition Plant

Date: 14 May 2014

Reviewer: Rich Mayer (EPA)
Respondent: AGEISS Team

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment No.	Reference	Comments	C, D, E or X[1]	Response
				The reviewer is correct that all chemicals for a given data gaps sample have the same reporting limit, i.e., there is no intra-sample variation in the data gaps samples' reporting limits. For example, 1,3,5-trinitrobenzene, 1,3-dinitrobenzene, etc. for surface water sample HB-ABERA-01SW all have a reporting limit of 2.7 micrograms/liter. However, this is not unexpected, and all explosives compounds analyzed by SW-846 Method 8330a (with a few exceptions) typically do have the same reporting limit as determined by the laboratory performing the analysis. The reporting limits differ slightly between data gaps samples (i.e., inter-sample variation) due to slight variances in sample volumes when the samples were collected (and the subsequent adjustment of the reporting limit necessary to present results based on a 1-liter quantity). It should be noted that for nondetects, the electronic database generates a surrogate value in the RESULTS column that is equal to one-half the DETECT_LIMIT value. Thus, because

Responses to Comments on
Baseline Ecological Risk Assessment Addendum
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Comment No.	Reference	Comments	C, D, E or X[1]	Response
				all results were nondetect for surface water, the repetition of values observed in the DETECT_LIMIT column in Table C-1 is also reflected in the RESULTS column. A surrogate concentration for nondetects is only needed to calculate summary statistics for chemicals that are detected at least once. Because no detections were observed for this medium, this surrogate value is unnecessary, and "ND" (not detected) will be inserted in the results column for all rows in Table C-1 to reduce confusion. Based on the information presented above, no other corrections to Table C-1 are considered necessary.
2	General	For Table B-1, regarding the sediments in Harrison Bayou, the concentration results and the detection limits are the same for all the explosive COCs, regardless of the date sampled. This table needs to be modified to include the correct results.	C	Agreed. The same detection limit was inadvertently copied for all rows in Table B-1. Because all samples were non-detect for all analytes, this also caused all results (which were calculated as being ½ the detection limit as a surrogate concentration for non-detects) to be identical for all rows. The detection limit column will be corrected to present the accurate

Responses to Comments on
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Longhorn Army Ammunition Plant

Date: 14 May 2014

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Respondent: AGEISS Team

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2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment No.	Reference	Comments	C, D, E or X[1]	Response
				values for each row. Because all sediment values were non-detect, a surrogate concentration is not needed for statistical purposes, and "ND" (not detected) will be inserted in the results column for all rows in Table B-1 to reduce confusion.
3	General	Please provide the analytical method used for the results in all data tables.	C	The analytical methods used for the 2013 data gaps samples (SW-846 Method 8330a) and any samples from investigations performed after the completion of the BERA and used in the revised dataset will be noted in the Appendix A, B, and C tables. The historical BERA data are presented in the BERA document (Shaw, 2007) and were derived from multiple investigations at the LHAAP facility. The analytical methods used for these samples can be obtained from the native source documents that describe these previous environmental investigations (e.g., the Group 2 Phase I Remedial Investigation performed by Jacobs Engineering Group in 1993). References for these native documents are provided in the BERA. Please note that an evaluation of the historical data detection limits

Responses to Comments on
Baseline Ecological Risk Assessment Addendum
Longhorn Army Ammunition Plant

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Comment No.	Reference	Comments	C, D, E or X[1]	Response
				and the degree that they are protective of ecological endpoints was previously performed and provided in the BERA (please see Section 8.4 of Volume 1, Shaw, 2007).
4	General	There needs to be a narrative section in the report discussing how the samples (soil/surface water/sediment) were taken and whether there were any changes/modification from the approved sampling procedure(s).	C	A brief statement is currently included in the text for each terrestrial sub-area and watershed stating that the samples were collected according to the methods presented in the work plan, and also refers the reader to Appendix D if any variances occurred during sampling. The following paragraphs will be added as the second paragraphs of Chapter 2.0 and 3.0, respectively, to describe in greater detail the sample collection methodology and any variances that occurred during the collection of the data gaps samples: (Chapter 2.0) *"Soil samples were collected from the three terrestrial sub-areas to address data gaps at the Longhorn facility at the locations described in the BERA Addendum work plan (AGEISS, 2013c). Sample collection methodology*

Responses to Comments on
Baseline Ecological Risk Assessment Addendum
Longhorn Army Ammunition Plant

Date: 14 May 2014

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2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment No.	Reference	Comments	C, D, E or X[1]	Response
				followed the approach detailed in the Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP) presented in Appendix G of the work plan. Surface soil samples were collected with a clean stainless steel spoon or trowel, and subsurface soil samples were collected using a clean hand auger and clean stainless steel spoon or trowel. Samples were processed, placed into sample containers, properly labeled, and shipped to the receiving laboratory for analysis. Samples were analyzed using Method SW-846 8330a for explosives. Any variances to the sampling or analytical procedures are described in Appendix D." (Chapter 3.0) *"Sediment and surface water samples were collected from Harrison Bayou watershed to address data gaps at the Longhorn facility at the locations described in the BERA Addendum work plan (AGEISS, 2013c). Sample collection methodology followed the approach detailed in*

Responses to Comments on
Baseline Ecological Risk Assessment Addendum
Longhorn Army Ammunition Plant

Date: 14 May 2014

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Comment No.	Reference	Comments	C, D, E or X[1]	Response
				the UFP-QAPP presented in Appendix G of the work plan. Sediment samples were collected with a clean stainless steel scoop or trowel. Surface water samples were obtained using a dipper equipped with a disposable cup. Sediment and surface water samples were placed directly into sample containers, properly labeled, and shipped to the receiving laboratory for analysis. Samples were analyzed using Method SW-846 8330a for explosives. Any variances to the sampling or analytical procedures are described in Appendix D."

Subject:	**Final Minutes, Monthly Managers Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Teleconference – 866-203-6896, passcode 1759304791**
Date of Meeting:	**July 15, 2015 – 10:00 AM**

Attendees:

Army BRAC:	Rose Zeiler
EPA:	Rich Mayer, Kent Becher (USGS Liaison)
TCEQ:	April Palmie
USACE:	Aaron Williams
AECOM:	Dave Wacker
AEC:	Robin Paul
USFWS:	Paul Bruckwicki

Welcome **AECOM**

Action Items

AECOM

- Provide a summary of nutrient data following fluidized bed reactor optimization. **In progress.**
- Plan 1,4-dioxane sampling. **Pending.** AECOM's sampling will occur in Fall to obtain seasonality. EPA's planned August sampling event also includes 1,4-dioxane sampling.
- Provide boring logs for all borings tapping into clay at bottom of shallow zone at LHAAP-67, LHAAP-37 and LHAAP-50. **Complete.**
- Send proposed LUC boundaries to Army for review immediately upon definition. **In progress.**
- Add quarterly perimeter well/surface water submittal to the tracker. **Complete.**
- Provide to the MMM group the status of GWTP's ability to discharge to Harrison Bayou. **Complete.**

Army

- USACE to provide technical direction for AECOM to address the LHAAP-67 vault. **In progress.**

EPA

- Develop a list of wells/sites for upcoming EPA split sampling and advise Army. **Complete.**
- Provide a date for EPA's contractor sampling event. **Complete.** August 18th is the tentative start date with activities expected to take 12 days, to include installation of the Beacon soil gas samplers at LHAAP-29.
- Develop/coordinate with Army on a schedule for surface water drainage sampling. **Postponed until next spring.**
- To minimize drilling effort, provide opinion on a clay thickness for LHAAP-67 considered sufficient to act as a laterally continuous aquitard between the shallow and intermediate groundwater. **Task revoked.**

TCEQ

AEC

USFWS

Defense Environmental Restoration Program (DERP) PBR Update AECOM

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

Item 1 (GWTP Quarterly Report) – 1st Quarter 2014 report is planned for submittal to agencies within the next 10 days.

Item 2 (LHAAP-18/24 Revised FS) – Currently scheduled for submittal to agencies on October 31, 2014.

Item 3 (Completion Reports) – RTCs being worked for agency comments on LHAAP-67 and LHAAP-58 RACRs

Item 4 (Monthly Managers' Meeting) – Next MMM scheduled for 10AM, Thursday, August 7th in the LHAAP Army Trailer. After lunch, the group may return for additional discussion on surface water sampling.

Item 5 (GW Network Optimization Memos) – Additional optimization memos will be submitted with RACRs before agency evaluation is expected.

Item 6 (LHAAP-29 Final RI/FS Addenda Work Plan) – LHAAP-29 field work is anticipated to be complete by the end of the month.

Item 7 (LHAAP-17 PDI WP, LHAAP-16 RD WP, LHAAP-03 RD/RAWP, LHAAP-04 RD, LHAAP-47 RD) – Placeholder for sites on hold due to dispute.

Item 8 (August RAB) – Scheduled for Thursday, August 7th at 6PM. A discussion of treatability testing will be included in the RAB briefing.

Item 9 (GWTP O&M) – Normal maintenance is on-going. Perchlorate plan memo and GWTP sampling optimization memo are in progress.

Item 10 (Admin Record Update) – AR Update for 1st Quarter 2014 is being prepared and should be completed by the end of the month.

Item 11 (BERA Addendum) – No update. Status from June 2014 was that final change sheets will be going out to the agencies, and the final version of the document will be placed in the AR.

Item 12 – (Nutrient Issue for HB and INF) – Discussed earlier in meeting.

Item 13 – (Website) – AECOM working to implement Army comments by July 25th.

Item 14 – (CRP/CIP) – Placeholder maintained in the tracker as a reminder that these requirements and recommendations are applicable to our work going forward.

Item 15 (LHAAP-12 RAO Report) – The RAO report has been reviewed by Army and is anticipated to be submitted to the agencies shortly. The memo relating to replacement of 12WW24

is being prepared and will be submitted for Army as soon as possible. The objective is to submit the 12WW24 well memo to the agencies at the same time as the RAO Report.

Item 16 (Surface Water Sampling Approach) – Surface water sampling approaches will be developed for each individual site requiring surface water monitoring, and these will be discussed at the next MMM.

Defense Environmental Restoration Program (DERP) PBR Update (continued) AECOM

- Upcoming field work – discussed earlier in the meeting
- Monthly data – no submittal this month due to limited validated data receipt
- Groundwater Treatment Plant – discussed earlier in the meeting

MMRP Update Army

- Update – No new information

Other Environmental Restoration Army

- Vault at LHAAP-67 – USACE plans to provide technical direction to AECOM today. AECOM will provide status update will be provided at the August MMM.
- Site 37 Bioplug – Army is awaiting sampling results. These results will be evaluated to determine whether extension of the demonstration period is warranted.
- Quarterly Reporting and Requirements
  - GWTP Evaluation with air monitoring data – Monthly air update provided.
  - Surface Water/Perimeter Well Quarterly Update – Recap of last 2 quarters is due to the Army
  - Administrative Record Update – discussed earlier in the meeting
- Annual Reporting
  - LUC Management Plan Update (due September 2014) – May be a significant update, to include LUC recordations at MNA sites.
  - CRP/CIP Revision (Biennial) and questionnaire October 2015

Programmatic Issues RM

- Status of Dispute – Mr. Mayer stated that he checks status of the Administrator's decision weekly. The decision is apparently moving toward completion, but no word on a date at this time.

USFWS Transfer Update PB

-

Schedule Next Managers' Meeting – Thursday, August 7th at 10AM, LHAAP Army Trailer.

New Action Items

AECOM

- Provide boring log for temporary well 67DPT14 at site LHAAP-67 to Mr. Mayer.
- Provide Army with individual surface water sampling plans for discussion at next MMM, with group to discuss how best to incorporate this information into the record (e.g., append RACRs, etc.).

Army

EPA

- Provide the Work Plan supporting EPA's contractor sampling event.

Adjourn

ACRONYM LIST

AEC	**United States Army Environmental Command**
AECOM	**AECOM Technology Services, Inc.**
AP	**April Palmie**
AR	**Administrative Record**
BERA	**Baseline Ecological Risk Assessment**
BRAC	**Base Realignment and Closure**
CRP/CIP	**Community Relations Plan/Community Involvement Plan**
DERP	**Defense Environmental Restoration Program**
EPA	**United States Environmental Protection Agency**
FS	**Feasibility Study**
GWTP	**Ground Water Treatment Plant**
HB	**Harrison Bayou**
INF	**Intermediate-Range Nuclear Forces**
LHAAP	**Longhorn Army Ammunition Plant**
LUC	**Land Use Control**
MMM	**Monthly Managers' Meeting**
MMRP	**Military Munitions Response Program**
O&M	**Operation and Maintenance**
PB	**Paul Bruckwicki**
PBR	**Performance-Based Remediation**
PDI	**Pre-Design Investigation**
RAB	**Restoration Advisory Board**
RACR	**Remedial Action Completion Report**
RAO	**Remedial Action Operation**
RAWP	**Remedial Action Work Plan**
RD	**Remedial Design**
RI	**Remedial Investigation**
RM	**Rich Mayer**
RMZ	**Rose M. Zeiler**
RTC	**Response to Comments**
TCEQ	**Texas Commission on Environmental Quality**
USACE	**United States Army Corps of Engineers**
USFWS	**United States Fish and Wildlife Service**
USGS	**United States Geological Service**
WP	**Work Plan**

FINAL
INSTALLATION-WIDE WORK PLAN
FOR
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers – Tulsa District

Prepared By:

AECOM

AECOM Technical Services

July 2014

Responses to Comments on
Draft Installation Wide Work Plan for
Longhorn Army Ammunition Plant, Karnack, Texas

28-August 2013

Reviewer: Richard Mayer, EPA

Respondent: Dave Wacker, AECOM

1. Respondent Concurs (C), Does Not Concur (D), Takes Exception (E), or Delete (X).
2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
1	Page 1-2, Table 1-1	Please add a note to LHAAP-37 (aka 35B in the past).	C	Note added to Table 1-1.	
2	Page 2-2, Second Paragraph (minor editorial comment)	The first use of RI/FS/RD/RA, so please define in text.	C	RI/FS/RD/RA defined in text.	
3	Page 3-3, Section 3.4	The text includes that NAD83 will be used for horizontal datum. The text should include which datum will be used for vertical datum as well (NAVD88?).	C	Reference to use of NAVD88 as vertical datum added.	

Responses to Comments on
Draft Installation Wide Work Plan for
Longhorn Army Ammunition Plant, Karnack, Texas

28-August 2013

Reviewer: Richard Mayer, EPA

Respondent: Dave Wacker, AECOM

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2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
4	Page 3-4 Section 3, First Paragraph	*"Sampling after a heavy rain is not recommended, since sediments can be stirred up by agitation and the result would not be a representative sample."* The issue of collecting data for surface water samples to properly monitor for surface water runoff events and potential groundwater interaction within the streams has been discussed numerous times during meetings/conference calls and comments have been provided as well. Surface water sampling should be conducted during a wide range of flows and events. This statement needs to be removed from the document and a SOP on how to properly collect surface water data with supporting parameters (discharge, heads in stream bed, gaining/losing) needs to be written. The continued collection of grab samples without supporting data continues to be a major technical flaw in the monitoring of surface water at the site. EPA does not consider surface water data collected without supporting parameters as adequate information to determine the relationship between surface water and groundwater at the site or the influence of surface runoff (from sites) on the surface water quality of the various drainages at the site.	E	Text has been removed from this section to allow the referenced SOP (Attachment 7 Surface Water Sampling) to address details of procedure.	
5	Page 6, QAPP	Please change the Lead Organization of the USACE from John Lambert to the new leader's name. Please see pages 8, 9, 14 as well.	C	At all noted locations, Mr. Lambert's information has been replaced with Mr. Smith's information.	
6	Page 7, QAPP (minor editorial comment)	The USGS acronym needs to be added to page 4.	C	Added to List of Acronyms and Abbreviations.	

Responses to Comments on
Draft Installation Wide Work Plan for
Longhorn Army Ammunition Plant, Karnack, Texas

28-August 2013

Reviewer: Richard Mayer, EPA

Respondent: Dave Wacker, AECOM

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2. Commentor Agrees (A) with response, or Does not Agree (D) with response.

Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
7	Page 17, QAPP	*"Who will collect and generate the data? All samples will be collected by AECOM personnel"*. EPA suggests adding "and/or qualified AECOM subcontractors". AECOM has used other subcontractors to collect data in the past.	C	Suggested text added.	
8	Page 18, QAPP	EPA suggests adding a row that covers criteria for instruments used for collection of field parameters (i.e., DO, ORP, pH).	D	Worksheet #12 relates to laboratory performance criteria for QC samples collected and submitted to the laboratory. The applicable worksheet for field instrumentation is Worksheet #22, covering calibration.	
9	Page 21, QAPP, Section 12.1, First Sentence	*"……water poured or through decontaminated field sampling equipment"*. EPA recommends adding a statement that requires water to be pumped through field equipment since the source water needs to go through a pump and tubing for a blank.	C	Section 12.1 text added in second paragraph stating "For pumps, source water must be pumped through the pump body and any associated tubing."	
10	Page 21, QAPP, Section 12.1, First Paragraph, Last Sentence	Please note that over the counter purchased distilled water has been used for inorganic and organic blank sampling at the site. This sentence states that the water must be certified which differs from actual field procedures observed at the site. So far equipment blanks have been clean, but as EPA has stated previously in other comments to the Army on Longhorn documents that there is a risk that an equipment blank will come back with detections and without lab certification of the source water, the source of the contamination would be unable to be determined (source water or equipment).	E	Sentence revised to read "Typically, retail distilled water will be utilized for rinsate blank source water. If laboratory-grade deionized source water is required for a particular application, the water certification results should be evaluated against the project-specific action levels and quantitation limits to ensure the water contains no analytes above these criteria."	
11	Page 25, QAPP, Section 12.11, First Paragraph (minor editorial comment)	Please add PARCCS to the acronym list.	C	Added to List of Acronyms and Abbreviations.	

Responses to Comments on
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28-August 2013

Reviewer: Richard Mayer, EPA

Respondent: Dave Wacker, AECOM

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
12	Page 25, QAPP, Section 12.11.1, Second Paragraph (minor editorial comment)	Please add RSD to the acronym list.	C	Added to List of Acronyms and Abbreviations.	
13	Page 27, QAPP, Third Paragraph (minor editorial comment)	Please add QCSR to the acronym list.	C	Added to List of Acronyms and Abbreviations.	
14	Page 30, QAPP, Survey Requirement for Existing Wells	Should this be for new wells and not existing wells? What about the vertical datum?	C	The word "Existing" has been removed from this heading. Both new and pre-existing wells are subject to survey. "NADV88" added to address vertical datum.	
15	Page 31, QAPP, Data Management Tasks	Please add that all field documentation will be provided to the regulators.	C	Sentence added to the end of the first paragraph states "Field documentation will be provided to EPA and TCEQ, typically as report appendices."	
16	Page 31, QAPP, Bullets	EPA suggests adding TCEQ to several of the bullets, since they may be on site as well.	C	TCEQ added to applicable bullets.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
17	Page 77, QAPP, Worksheet #18	There are a number of rows that do not indicate the sampling location. In some cases, the well may have not yet been installed, so this is a place holder for the QAPP as a working document. Please verify that all wells that are in place as of October 2013 are listed in this table. There also appears to be missing data within the table such as screen depth for wells (i.e., 18WW19), analytical group and so forth. The table appears to be incomplete.	E	UFP format QAPP Worksheet #18 is intended to function as a sampling and analysis plan for a specific site or project, unlike the Longhorn QAPP which is used as a long-term site-wide document, including multiple sites in various life cycle stages. The nature of the Longhorn QAPP makes inclusion of specific sampling locations and analytes inappropriate, as these are frequently changing and would invalidate the QAPP any time a change to a sampling location or parameter is made. Worksheet #18 has been revised to refer the reader to site-specific work plans for an accounting of current sample locations and analytes.	
18	Page 90, QAPP, Perchlorate	Preservative should include filtration, since the purpose of the filtration is to remove microbes to preserve the sample.	C	"Filtration (0.2µm)" added to preservative cell for perchlorate.	
19	Page 95, QAPP, Water Quality Meter	EPA suggests adding post calibration to the table. Post calibration is a good QA/QC check to make sure the meter is still working properly at the end of the day.	C	For Water Quality Meter and PID, Calibration Activity cell text modified to state "Daily - Before Use and After Last Use"	
20	Page 114, QAPP, Worksheet #25	Please add field parameter instrumentation to the worksheet.	D	Worksheet #25 pertains to laboratory instrumentation. Worksheet #22 covers field equipment calibration, maintenance, testing and inspection.	
21	Page 124, QAPP	Please see comment number 7 above.	C	Text added.	

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22	Page 126, QAPP, Worksheet #28	It appears that duplicates and blanks need to be added to this table?	D	Method blanks are already in the tables in worksheet #28. Duplicates are being analyzed in MS/MSD samples, or with LCS/LCSD samples where MS/MSD samples are not applicable. If field duplicates are being referred to, then field duplicate criteria is stated in worksheet #12.	
23	Page 152, QAPP, Worksheet #30	The table indicates that data will be turned around in 14 days, however; previous document text indicates it will be 10 days (see page 17). Please clarify.	E	Microbac has a standard 10 business day or 14 calendar day turn around time. The text "14-calendar day turn around time" has been added.	
24	Attachment 1 SOP, Section 5.5, Number 4	EPA agrees that this is a very good way to determine which portions of the soil cores should be sampled due to PID readings, however; the rest of the soil sample (during the 5 minutes the sample is allowed to heat up) is still open to the environment allowing VOCs to escape. EPA suggests adding a step that would shade and cover the rest of the soil core to avoid loss of volatiles. Same comment applies to Section 5.7.	C	In Section 5.5, an additional step was inserted to read: "2. Place the remainder of the soil/sediment in aluminum foil, glass jar or other appropriate container with minimal headspace. Store in a shaded location or container to preserve volatile content until determined whether collection of analytical samples of the material is required." In Section 5.7, an additional step was inserted to read: "3. Cover the remainder of the soil/sediment with aluminum foil. Store in a shaded location or container to preserve volatile content until determined whether collection of analytical samples of the material is required."	
25	Attachment 2 SOP, Number 2	EPA suggests tagging the bottom of the well at this point to determine well integrity and compare with historical data of well depth. Based on EPA field observations at the site, AECOM does collect the total depth during sampling, so please add it to SOP.	C	In Section 5.4, an additional step was inserted to read: "3. Measure total well depth using the electric water level indicator probe."	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
26	Attachment 2 SOP, Section 5.4, Item 3a	EPA agrees with this statement, but the water-quality sampler needs to know where the productive zones are in the well (even though there are very few highly productive zones at LHAAP due to the geology). Based on more recent sampling observations at the site by EPA/USGS personnel, the sampler has been provided a detailed spreadsheet to determine well information. However, the reviewer is not sure if the detailed spreadsheet included the productive zones. Please verify that is the case.	C	Due to other document changes, this item has been renumbered as 4a. An additional sentence has been added to the end of Item 4, reading "Review well boring log to determine whether areas of relatively higher conductivity (K) exist within the screened interval." Located in this position, this instruction applies to Items 4a, 4b and 4c.	
27	Attachment 2 SOP, Number 13, First Sentence	Please list what is considered the acceptable variability (i.e., reference Section 5.7)	C	Due to other document changes, this item has been renumbered as 14. Section 5.7 has been reference as suggested.	
28	Attachment 2 SOP, Number 6	Please include that if the turbidity is 10 or higher (i.e., reference Section 5.7) a filtered and raw (unfiltered) sample will be collected for laboratory analysis for metals.	C	The first two sentences now read: "If collecting a field-filtered sample for metals (i.e., turbidity is equal to or greater than 10 NTU), use an inline disposable filter. For each filtered sample submitted to the laboratory for metals analysis, a corresponding raw (unfiltered) water sample must also be submitted to analysis."	
29	Attachment 2 SOP, Section 5.7, First Paragraph, Last Sentence	Please add that if a bailer is used that DO should not be collected. DO will change rapidly when water is exposed to the atmosphere. DO should only be collected while using a pump through a flow-through cell.	C	The following statement has been added to the end of the first paragraph: "(DO readings will not be collected from bailed water, but only from a flow through cell.)"	
30	Attachment 3 SOP, Section 5.6, Number 1	Please add a reminder that DO should not be measured from bailer sampling.	C	The following statement has been added to the end of the Item 1: "(DO readings will not be collected from bailed water, but only from a flow through cell.)"	

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31	Attachment 7 SOP, Section 6.1, Number 1	Please see comment 4. *"Sampling after a heavy rain is not recommended, since sediments can be stirred up by agitation and the result would not be a representative sample."* The issue of collecting data for surface water samples to properly monitor for surface water runoff events and potential groundwater interaction within the streams has been discussed numerous times during meetings/conference calls and comments have been provided as well. Surface water sampling should be conducted during a wide range of flows and events. This statement needs to be removed from the document and a SOP on how to properly collect surface water data with supporting parameters (discharge, heads in stream bed, gaining/losing) needs to be written. The continued collection of grab samples without supporting data continues to be a major technical flaw in the monitoring of surface water at the site. EPA does not consider surface water data collected without supporting parameters as adequate information to determine the relationship between surface water and groundwater at the site or the influence of surface runoff (from sites) on the surface water quality of the various drainages at the site.	D D	For the purposes of surface water sampling at Longhorn Army agrees that certain supporting information should be collected during surface water sampling, but does not agrees with EPA's position that the relationship between surface water and groundwater must be understood to render the sampling data adequate. Supporting information such as weather, whether the stream is flowing or is ponded, stream bed elevation where available and groundwater elevation of nearby wells will be collected. However, it is the purpose of the surface water sampling that drives the protocol. If the objective is to evaluate whether there is an impact to surface water by groundwater, then sampling should take place when base flow is present. In this case, it would not be prudent to sample during a rain event because any entrained sediments in runoff could confound the results. If there is reason to believe that a higher groundwater table encounters a contaminated soil zone not present in the saturated zone during times of a lower groundwater table, surface water would be sampled as soon as runoff ends after a rain event. To measure groundwater impact on surface water, it is not important to know whether the surface water body is gaining or losing in the area of concern because a gaining stream would clearly mean the groundwater impact would be measured during sampling, and a losing stream would not have a groundwater impact as it would be a loss of surface water to groundwater (already impacted by contamination). For any sampling frequency - quarterly or annually - sampling should take place when the	

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31 (cont.)	Attachment 7 SOP, Section 6.1, Number 1			groundwater table is expected to be the highest. If the purpose of the sampling is to evaluate impact to the surface water from runoff in an area believed to have surface soil contamination, then, yes, the surface water should be sampled during a rain event or immediately thereafter while runoff is still occurring. The purpose for sampling is derived from the conceptual site model, specifically, any complete pathway. The objective of surface water sampling is to obtain information on the character of water at that location at that point in time. Entrained sediments can impart properties to the sample that are not characteristic of the water itself and are, therefore, not representative. The need for assessment of the relationship between surface water and groundwater was considered during the remedial investigation phases of Longhorn sites. Subsequent agency-approved remedial design documents do not specify collection of data required to study the relationship between surface water and groundwater. Therefore, Attachment 7, as a project-specific SOP designed to fit the needs of sites at Longhorn, does not require collection of such data.	
32	Attachment 7 SOP, Section 6.1, Number 5	This should state that the flow rate will be measured. A SOP for measuring the flow should be prepared (SOP Attachment 18 could be modified to determine discharge at each sampling location).	-	Number 5 in Section 6.1 already states that the flow rate will be measured. A reference to Attachment 18, which provides guidance for measuring the velocity of flowing water, has been added.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
33	Attachment 7 SOP, Section 7.1, Number 1 and 2	EPA generally disagrees with these two provisions. Surface water samples should be collected during high, medium, and base-flow conditions to adequately access potential contaminant transport at Longhorn. The best way to determine if groundwater is interacting with surface water is to collect heads and samples from the stream bed at various locations during the reach during different flow events.	D	See response to Comment #31.	
34	Attachment 7 SOP, General Comment	EPA recommends the collection of field parameters in conjunction with surface water sampling. This data could be used to determine if there are any changes in field parameters in different reaches of a stream body.	-	Noted.	
35	Attachment 12 SOP, Number 7	EPA recommends the use of bentonite slurry (via tremie pipe) in replacement of chips or pellets. Pellets and chips tend to not seal very well which has been shown in studies by the National Groundwater Association. At least 2 to 4 inches of very fine sand should be placed above the filter pack if bentonite slurry is used.	D	When installed correctly, bentonite chips and pellets create an effective seal above the filter pack.	
36	General Comment, SOP Attachment 12 (prior comment by EPA on IWWP May 2011)	The SOP does not indicate that the drilling equipment will be decontaminated prior to demobilizing. Please add this to the SOP.	D	The requirement for pre-demobilization decontamination of drilling equipment is presented in Section 5.4, Attachment 9 Decontamination of Field Equipment.	

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37	General Comment, SOP Attachment 12	EPA still recommends that wells be designed to formation material following procedures described by David Nielson (National Groundwater Association). EPA believes good well design will help deter well screen plugging from the fines, increase yields, and lower turbidity. In addition, as recommended in the past, V-wire screen would provide more percent open area to the filter pack and less clogging of the screens.	E	Groundwater monitoring wells at Longhorn are constructed in accordance with industry standard, and are compliant with Texas Administrative Code and Pineywoods Groundwater Conservation District rules. The nature of formation materials is known, and the combination of 0.010-inch screen opening and 20-40 sand pack has been successfully used in dozens of wells across the site. Longhorn groundwater monitoring wells constructed in this way have functioned well, without notable instances of clogged well screens. Low-flow sampling is utilized to reduce sample turbidity, and any well unable to achieve acceptable turbidity levels at sampling is typically successfully addressed through well redevelopment. Because Longhorn's current well construction methodology using slotted screens has been successful, conversion from slotted screen to stainless steel continuous-slot v-wire is not deemed necessary. Well construction methods and materials will be continuously evaluated as work proceeds, and variations from current practices considered when warranted.	
38	Attachment 15 SOP, Section 6.1, Last Sentence	Please see comment 19.	-	Comment 19 states: "EPA suggests adding post calibration to the table. Post calibration is a good QA/QC check to make sure the meter is still working properly at the end of the day." The referenced sentence is in aligned with this comment, so no modifications have been made in response.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
39	General Comment, SOP for Collecting Geotechnical Samples	Please include a SOP for collecting geotechnical samples.	D	Standard Penetration Testing is addressed in SOP Attachment 5, Section 5.3.2, where collection in accordance with ASTM D1586-84 is referenced. Other materials collected for geotechnical testing that do not require preservation of "undisturbed" in-situ conditions (grain size analysis, moisture content, hydraulic conductivity) do not require detailed collection instructions, but Section 5.3.4 instructed samples for chemical analysis to be collected prior to any samples not requiring chemical analysis.	

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Reviewer: April Palmie, TCEQ

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
1	General	Comments were previously provided for many of the SOPs; see e-mail dated 8/29/13 at 4:31 pm. Please look for extra ".", there are several in the narrative portion	C	Extra "." have been removed from narrative portions of SOPs 2, 3, 5, 6, 7, and12.	
2	SOP	Attachment 21 was missing, unable to review.	C	Attachment 21, SOP for Air Sampling has been added.	
3	2.3; 2-3	Last sentence in section should read "…information is included"	C	Text corrected to read "…information is included…"	
4	2.4; 2-3	First sentence needs a date and reference. Do we really need to include population numbers? Could we use approximate or less than?	C	Text changed to read "…with a population of approximately 2,500 people (http://zipcode.org/city/tx/karnack). The incorporated community of Uncertain, Texas, population less than 100 (http://www.city-data.com/city/Uncertain-Texas.html), is a resort area…"	
5	Figure 2-2	Please change title of figure and above the list of sites. "LHAAP Primary to DS01 Sites" and "LHAAP Map of Task Order DS01 Sites" could be replaced with "LHAAP Sites covered by the IWWP"	C	Figure title, list label and text have been changed to read "LHAAP Sites Covered by the IWWP".	
6	3.2; 3-1 And elsewhere	References to SOP Attachments should include the NAME of the SOP, not just the Attachment number.	C	SOP names have been included with Attachment numbers in SOP references throughout the document.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
7	3.3; 3-2	This sentence in first paragraph is missing words between the underlined words: "If necessary, soil sample will be collected continuously sampler advanced ahead of the drill bit"	C	Text changed to read "If necessary, soil samples will be collected continuously using a sampler advanced ahead of the drill bit."	
8	HASP 4.11.5	This section contains a reference to Billings, Montana.	C	Billings, Montana replaced with Karnack, Texas.	
9	QAPP Pages 8 & 14	April Palmie's e-mail address needs to be updated	C	April Palmie's email updated to april.palmie@tceq.texas.gov.	
10	QAPP Page 10	Terms or phrases represented by acronyms in org chart are not obvious to a person unfamiliar with the sites and the organizations. For example, WERS is not defined in the acronym list or the text preceding its use.	C	WERS added to the acronym list.	
11	QAPP Page 15	a. In the paragraph beginning "Remedial activities are planned under this project . . .". The second and third sentences are not clear. Either the punctuation or structure of these sentences should be evaluated. b. Under "The environmental questions being asked:" please include a bulleted statement or question related to chromium and include the purpose for collecting chromium III data. On Page 17 under "What types of data are needed?" chromium VI is listed. Page 56 includes a table for aqueous, trivalent chromium analysis by SM3500/6010B/6020, but the intended use of those data is not clear.	C C	Sentences have been restructured. Reference to hexavalent chromium has been removed from Worksheet #11, "What types of date are needed?" statement.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
12	QAPP Page 16	a. In bulleted list for LHAAP-58, the acronym EISB should be defined.	C	EISB has been defined and added to acronym list.	
		b. (Editorial) In paragraph beginning "Previous investigations, and remedial actions . . .", subject/verb agreement for "media" needs to be correct.	C	Text corrected to state "media have been impacted"	
		c. Under "The possible classes of contaminants and the affected matrices" is a list of contaminants for soil and water. Are all of the contaminants found in both soil and water? If so, no change needed. If not, then consider including more detail.	C	This statement has been modified to read, "Perchlorate and chlorinated solvents in water. Each activity has different sampling frequencies and analytical parameters depending on the site."	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
13	QAPP Page 17	a. Under "What type of data are needed?" – The first three statements limit the sampling to only groundwater, surface water, and air. Earlier, in last paragraph on Page 5, soil was identified for sampling activities under this plan. Please resolve the discrepancy.	C	Sentence added reading "Soil will be sampled at various locations."	
		b. Under "Who will collect and generate the data?" – The plan states Microbac Laboratory in Marietta [GA] will perform all analyses. That laboratory is not NELAP-accredited in Texas and use of those data by TCEQ is not allowed under 30 Texas Administrative Code (TAC) 25 unless the laboratory or the site meets one of the exceptions in 30 TAC 25.6. Also, as noted in comments below, the Microbac Laboratory in Marietta is not the only laboratory identified as performing analyses.	E	All labs anticipated to provide analysis of samples have been added to the text. Microbac Laboratories, Inc. holds TCEQ NELAP-Recognized Laboratory Accreditation, under Certificate Number T104704254-13-6. Microbac will act as the prime laboratory, subcontracting air and biological analysis to the labs described below. Microbac will perform all general chemistry analyses. ALS Environmental holds TCEQ NELAP-Recognized Laboratory Accreditation, under Certificate Number T104704413-13-4. ALS will be a subcontract lab to Microbac, and will perform air analyses. Microbial Insights provides analytical services to which NELAP accreditation is not applicable. Microbial Insights will be a subcontract lab to Microbac, and will perform dehalococcoides and functional gene analyses. CT Laboratories, holds DoD-ELAP certification, but not Texas NELAP-Recognized Laboratory Accreditation. This lab was used only a one-time basis to analyze only DPT hydropunch samples not used in plume delineation.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
14	QAPP Page 22	a. Section 12.3 – Identify the worksheet number where the project-specific RPDs are defined for field duplicates.	C	RPDs are defined specific to particular analytes/methods (See Worksheet 15), and are applicable to all types of samples, including field duplicates. Reference to Worksheet 15 added.	
		b. Section 12.4, First sentence (editorial) – Insert "to" before "which."	C	Text added.	
		c. Section 12.5, Paragraph 2 – Line 2 includes statement "One LCS shall be included in every analytical batch." On Page 19, Worksheet #12 requires an LCS and LCS duplicate (LCSD) per analytical batch, and on Page 26, in Section 12.11.2, accuracy is assessed using an LCS and LCSD. Please resolve the discrepancy.	C	Section 12.5 text revised to read "One LCS/LCSD shall be included in every analytical batch."	
15	QAPP Page 23	a. (editorial) First line and throughout – When using an acronym, the preceding article used should be based on the sound made when pronouncing the acronym. For example, the acronym "LCS" starts with the vowel sound "el", so the article used should be "an" as in 'an LCS'.	C	Text changed.	
		b. Section 12-6 –			
		i. Paragraph 1 (editorial) - Period is needed at end of paragraph.	C	Period added.	
		ii. Paragraph 3, Line 2 (editorial) - Insert "to" between "not" and "be".	C	Text added.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
16	QAPP Section 12 throughout	Several of the sections state the appropriate data qualifier shall be applied to the sample results if the corrective actions are not performed or are not effective. I recommend revising to clearly identify the entity first responsible for applying the flag. For example, "If the corrective actions are not performed or are not effective, the laboratory will apply the appropriate flag to the sample results to advise the data user of the uncertainty in the result." Later, the data validator can apply the final qualifier based on consideration of all of the data and the project objectives.	C	Section 12.11.7 Application of Data Qualifiers has been added to clarify. Text of this section reads, "If corrective actions are not performed or are not effective, the laboratory will apply an initial appropriate flag to the sample result to advise the data use of the uncertainty in the result. The data validator will apply the final qualifier based on consideration of all data and project objectives."	
17	QAPP Page 24, Section 12.9	The citation to SW846 Method 8000 should be updated to Method 8000C unless Method 8000B must be used for this project.	C	There is no difference between Method 8000B and Method 8000C with respect to determination of retention time windows, so the text has been changed as requested to reflect Method 8000C.	
18	QAPP Page 25, Section 12.11	Include a reference back to Worksheet #12 or other appropriate worksheets where the project-specific acceptance criteria can be found.	C	Text added in Section 12.11.1 reading "Project-specific acceptance criteria can be found in Worksheet 12."	
19	QAPP Page 28, Section 12.11.5	The text states mg/L will be used for reporting inorganics in water samples and ug/L will be used for reporting metals in water sample. Commonly, metals are considered inorganics. It would be helpful to have an example included in the text for the term 'inorganics'. Verify the units specified in this text agree with the units listed for the different methods in Worksheet #15.	C	Text corrected to indicate metals will be reported in units of mg/L, consistent with Worksheet #15.	

Responses to Comments on
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Longhorn Army Ammunition Plant, Karnack, Texas

28-August 2013

Reviewer: April Palmie, TCEQ

Respondent: Dave Wacker, AECOM

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
20	QAPP Page 30	a. The text cites several attachments to the QAPP, but no attachments were found.	D	Citations refer to the Installation Wide Work Plan (IWWP) attachments.	
		b. Analysis Tasks – The purpose of this subsection appears to be the listing of analytical methods for the chemicals of concern (COCs). The text clearly states the methods for COCs in lines 1 through 3. Line 4 only lists the COCs and not the methods. The text should be revised to include the method or to explain why the methods for these COCs do not need to be identified in this subsection. The same text, included on Page 16, under What types of data are needed? should be revised also.	C	Text in both locations has been revised to name all methods.	
		c. QC Tasks – Consider including optional field blanks for volatile analysis to be collected when ambient conditions warrant.	C	Text modified to add the sentence, "Field blanks for VOC analysis will be collected and analyzed when ambient conditions warrant."	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
21	QAPP Page 31, Documentation and Records	The bulleted list of information to be entered into the logbook appears to be site information to be recorded. This section needs to also include the information to be entered for field measurements and each sample collected. That information, as applicable, should include, but is not limited to: a. Date and time of measurement or sample collection b. Location description and/or global positioning system (GPS) coordinates c. Measurement/Sample identification d. Measurement/Sample collection method e. Measurement/Sample collection equipment used, including identification numbers and the manufacturer name/model number, as appropriate f. Calibration standards, buffers, etc. including manufacturer, lot numbers, and expiration date g. Initial and continual calibration data and meter end checks h. Measurement values for non-logging equipment i. Sample containers (number and type) j. Sample preservation (chemical, ice, etc.) k. Physical description of matrix measured or sampled l. Maps/sketches m. Conditions that may adversely impact the quality of measurements/samples, if applicable (for example, rain, wind, smoke, dust, extreme temperatures, etc.) n. Photograph log.	C	These data items have been listed as part of the last sub-bullet in the Documentation and Records bullet, which has been modified to read: "Descriptions of all sampling activities including visual observations and physical measurements. For sampling activities, the following information should be recorded, either in the field logbook or on an appropriate data sheet or other appropriate method (e.g., photographs):"	
22	QAPP Page 32, Data Review Tasks	Refer the reader to the project specifications for data review	C	First sentence of Data Review Tasks revised to read "Data will be reviewed within the context of specific project and sampling objectives."	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
23	QAPP Pages 33 through 74, Worksheet #15	– as applicable to the information in each table, revise the table to:			
		a. Make the units for the PCLs and the units for the laboratory specific limits the same,	C	a. Units for applicable regulatory standards and laboratory-specific limits have been made the same.	
		b. Convert the TCEQ PCL values from scientific notation to numbers,	C	b. Scientific notation format has been replaced with ordinary decimal notation.	
		c. Include "C/I" in column heading to denote PCL is for commercial/industrial use,	E	c. MSCs have replaced PCLs which were used in error. MSC column headings include "-Ind" to indicate industrial standards.	
		d. Use bold font to identify known or reasonably anticipated COCs for the sites, and	C	d. Bold font has been added to identify known or reasonably anticipated COCs for the sites.	
		e. When the LOQ for a COC is greater than the TCEQ PCL, highlight the LOQ and verify the propose LOQ will meet the project objectives for the COC.	C	e. DLs, LODs, and LOQs greater than the applicable regulatory standard have been note with bold, italic type. Three analytes cannot be detected at the regulatory standard concentration using the method stated in the QAPP. None of these analytes are Longhorn COCs for any site, resulting in no impact to achievement of project objectives. <u>1,2-Dibromo-3-chloropropane (aqueous) by 8260</u> – Regulatory standard is 0.2 µg/L, detection limit 1 µg/L. If this analyte becomes a COC, method 8011 can be employed to achieve 0.023 µg/L LOD and 0.046 µg/L LOQ. <u>1,2-Dibromoethane (aqueous) by 8260</u> – Regulatory standard is 0.05 µg/L, detection limit is 0.25 µg/L. If	

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				this analyte becomes a COC, method 8011 can be employed to achieve 0.023 µg/L LOD and 0.046 µg/L LOQ. 1,2,3-Trichloropropane (aqueous) by 8260 – Regulatory standard is 0.041 µg/L, detection limit is 0.5 µg/L. Although this analyte is not a listed analyte for Method 8011, it is possible to analyze with 8011 to achieve a lower detection limit if this analyte becomes a COC. Five analytes can be detected but not quantified at the regulatory standard concentration using the method stated in the QAPP. 2-Chloroethyl vinyl ether (aqueous) by 8260 – Regulatory standard is 2.6 µg/L, LOQ is 10 µg/L. No current method can achieve a lower LOQ. This analyte is not a COC at Longhorn, so should not impact project data objectives. 2,4-DNT (aqueous) by 8330 – Regulatory standard is 0.42 µg/L, LOQ is 1 µg/L. No current method can achieve a lower LOQ. Because the analyte can be detected at or below the regulatory standard, ability to delineate plumes to the regulatory standard concentration is not impacted. The inability to quantify concentrations between 0.42 µg/L and 0.99 µg/L is not deemed a significant impact to project data objectives. 2,6-DNT (aqueous) by 8330 – Regulatory standard is 0.42 µg/L, LOQ is 1 µg/L. No current method can achieve a lower LOQ. Because the analyte can be detected at or below the regulatory standard, ability to	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
				delineate plumes to the regulatory standard concentration is not impacted. The inability to quantify concentrations between 0.42 µg/L and 0.99 µg/L is not deemed a significant impact to project data objectives. 2,4-DNT (soil) by 8330 - Regulatory standard is 0.042 mg/kg, LOQ is 0.4 mg/kg. Because the analyte can be detected at or below the regulatory standard, ability to delineate areas of soil impacts to the regulatory standard concentration is not impacted. The inability to quantify concentrations between 0.042 mg/kg and 0.4 mg/kg is not deemed a significant impact to project data objectives; however, Method 8270 can achieve DL of 0.025 mg/kg and LOQ of 0.050mg/L if changing project data objectives require. 2,6-DNT (soil) by 8330 – Regulatory standard is 0.042 mg/kg, LOQ is 0.4 mg/kg. Because the analyte can be detected at or below the regulatory standard, ability to delineate areas of soil impacts to the regulatory standard concentration is not impacted. The inability to quantify concentrations between 0.042 mg/kg and 0.4 mg/kg is not deemed a significant impact to project data objectives; however, Method 8270 can achieve DL of 0.025 mg/kg and LOQ of 0.050mg/L if changing project data objectives require. Beryllium (soil) by 6010 – Regulatory standard is 0.40 mg/kg, LOQ is 1 mg/kg. Beryllium in soil is not a COC at Longhorn for any site, resulting in no impact to achievement of project objectives. Axial measurement can achieve LOD of 0.05 mg/kg and LOQ of 0.1 mg/kg if beryllium in soils becomes a COC.	

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Comment #	Section/Page Paragraph	Comment	C, D, E or X[1]	Response	A or D[2]
				Selenium (soil) by 6010 – Regulatory standard is 0.40 mg/kg, LOQ is 10 mg/kg. Selenium in soil is not a COC at Longhorn for any site, resulting in no impact to achievement of project objectives. Axial measurement can achieve LOD of 0.5 mg/kg and LOQ of 1.0 mg/kg if selenium in soil becomes a COC.	
24	QAPP Page 56, Aqueous, Trivalent Chromium	a. Insert an asterisk after "Chromium" in the 'Analytical Group' heading to advise the reader to refer to the notes on the table. b. In all blanks in the table, enter "NA". c. In the notes section, either replace "between" with "difference" or show the calculation for obtaining trivalent chromium concentrations from total and hexavalent chromium concentrations.	C C C	Asterisk inserted. NA entered for all blanks in table. Note revised to read "Trivalent chromium value is the calculated difference of total chromium and hexavalent chromium."	
25	QAPP Page 70, Aqueous, Dissolved Gases, RSK175	The table lists as the analyte "Iron, Ferrous – Laboratory." The RSK175 method is for dissolved gases. Iron is not a dissolved gas. Please review the information in this table and revise as needed.	C	Header information for this table corrected to read: "Analytical Group: Iron, Ferrous "Method: SM3500Fe-B-1997"	
26	QAPP Page 72, Aqueous, Semi-volatile Organic Compounds, 8270D	The LOQ listed for hexachlorobenzene (HCB) is an order of magnitude higher than the PCL. Evaluate the LOQ against the project objectives for HCB to determine if the proposed LOQ meets the intended use for the HCB data. If the proposed LOQ is too high, consider analyzing for HCB using 8270D select ion monitoring (SIM) mode to lower the LOQ.	X	Hexachlorobenzene was erroneously included in the analyte listing. References to hexachlorobenzene have been removed from the QAPP.	

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27	QAPP Page 73	Table says "Aqueous" and lists MCLs, but the units in the table are for solid samples. Please resolve the discrepancy. Consider using 8270D in the SIM mode to achieve a lower LOQ.	X	Hexachlorobenzene was erroneously included in the analyte listing. References to hexachlorobenzene have been removed from the QAPP.	
28	QAPP Page 74	Revise the table to: a. Indicate the analyte is 2,3,7,8-tetrachlorodibenzo-p-dioxin toxicity equivalent quotient (2,3,7,8-TCDD TEQ). b. Include the soil and water PCLs for 2,3,7,8-TCDD TEQs.	C E	a. Analyte name modified as requested. b. EPA MCL (water) of 0.00003 ug/L added. PCLs were not added as Longhorn is not subject to TRRP, but is grandfathered into RRR. No MSC or mechanism for calculating a MSC was identified.	
29	QAPP Page 90, Worksheet #19	For aqueous samples collected for volatile analysis, insert a row for collecting unpreserved samples when vinyl chloride is found or reasonably anticipated. See SW846 Chapter 4 regarding sampling and handling when reactive volatiles are COCs. As data are being generated, monitor the groundwater for the biodegradation chemicals of trichloroethene. Those chemicals are the cis- and trans-dichloroethenes and vinyl chloride. If the cis- or trans-dichloroethene or vinyl chloride is found and if vinyl chloride is the primary risk driver, begin collecting the groundwater samples in unpreserved vials with a 7-day hold time from collection to analysis.	C	A row has been added to Worksheet #19 to provide for non-acid preservation of samples where highly reactive organics are the primary risk driver at a site. Highly reactive organics are not primary risk drivers for any sites where final RODs are in place. The need for separate unpreserved sampling for highly reactive organics will continue to be assessed as other sites move through the CERCLA process.	
30	QAPP Page 91	For solid samples collected for volatile analysis, reference SW846 Method 5035 for the collection and preparation of the solid samples.	C	SW846 5035 added to the Analytical and Preparation Method cell for analysis of VOCs in solid matrices. Use of SW846 Method 5035 is also referenced in Laboratory SOP PAT01 (Purge and Trap for Volatile Organics – Methods SW846 5030B, 5030C, 5035A Revision 13)	

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31	QAPP Page 124, Worksheet #26	The Sample Receipt and Analysis and Sample Disposal sections indicate Microbac, Ohio will perform these activities. Page 17 states Microbac, Georgia (Marietta) will perform all of the analyses. Please resolve the discrepancy.	C	No reference to "Georgia" was identified in the document; however, references to the location of Microbac have been examined throughout the document for consistency. References to the location of Microbac now state either "Ohio" or "Marietta, Ohio" as appropriate. All Microbac samples will be analyzed at the Marietta, Ohio lab with the exception of Dhc which will be performed by their Maryville, TN lab.	
32	QAPP Page 125, Worksheet #27	cites Microbac, Ohio. Please resolve discrepancy with Page 17 statement(s) regarding Microbac - Marietta.	C	See response to Comment #31	
33	QAPP Pages 126 through 149,	Worksheet #28 should include expected performance for the LCSD. Worksheet #12 and related text require an LCSD. Please resolve the discrepancy.	C	LCSD performance criteria have been added to each of the method tables in Worksheet #28.	
34	QAPP Page 139 (editorial)	The term "LCS" needs to be fixed.	C	LC) replaced with LCS.	
35	QAPP Pages 152 and 153	Worksheet #30 references the Microbac Ohio, Microbac Tennessee, and ALS Environmental laboratories. Please resolve discrepancy with statements regarding Microbac Marietta laboratory on Page 17.	C	Text throughout has been expanded to discuss all laboratories planned to be used for analytical tasks.	

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36	QAPP Page 163	a. Paragraph 1 implies the laboratory will report some of the project data in USEPA Level IV data packages and refers the reader to Worksheet #29 which contains the list of project documents and records tables. The information the reader is to gain from Worksheet #29 is not clear. Please clarify. Also, please cite the standard operating procedure (SOP) for data validation if an SOP is available.	X	Reference to Worksheet #29 was in error and has been deleted.	
		b. Paragraph 3 – It is not clear from this text if the qualitative identification and quantitation performed by the laboratory will be validated as part of the data validation process. The National Functional Guidelines (NFGs) are cited in Paragraph 2 on Page 164, but in the context of blank evaluation. If the NFGs will be used for evaluating other QC performance data, please revise text to include that information.	C	Paragraphs 1 – 3 have been modified to include National Functional Guidelines, laboratory derived control limits and professional judgment as guidance for evaluating laboratory data.	

INSTALLATION-WIDE WORK PLAN

FOR

LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers – Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma 74128

Prepared By:

AECOM
112 East Pecan Street, Suite 400
San Antonio, Texas 78205

Contract No. W912DY-09-D-0059

Task Order No. DS01

AECOM Project No.s: 60256135 and 60274185

July 2014

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Appendix B: Quality Assurance Project Plan

Appendix C: Standard Operating Procedures

Acronyms and Abbreviations

°F	degrees Fahrenheit
AECOM	AECOM Technical Services, Inc.
ASTM	American Society for Testing and Materials
bgs	below ground surface
GPS	global positioning system
GWTP	ground water treatment plant
HASP	Health and Safety Plan
HDPE	high-density polyethylene
INF	Intermediate-Range Nuclear Forces
IWWP	Installation-Wide Work Plan
LHAAP	Longhorn Army Ammunition Plant
pH	hydrogen ion concentration
PMP	Project Management Plan
PPE	personal protective equipment
PVC	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QASP	Quality Assurance Surveillance Plan
QC	quality control
RA	Remedial Action
RI	Remedial Investigation
SWMU	solid waste management unit
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TNT	trinitrotoluene
U.S.	United States
U.S. Army	U.S. Department of the Army
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

1 INTRODUCTION

AECOM Technical Services, Inc. (AECOM) was contracted by the United States (U.S.) Army Corps of Engineers (USACE), Tulsa District, to perform remediation activities associated with remediation of multiple sites at the Longhorn Army Ammunition Plant (LHAAP) under Worldwide Environmental Remediation Services Contract No. W912DY-09-D-0059. Management of work performed under this contract will be performed by the Tulsa District of the USACE. Work by AECOM at LHAAP will be performed under Task Order DS01 of the above-referenced contract. As part of the remediation activities, AECOM has been tasked with preparing plans to support field implementation of investigation and remediation activities during the completion of work under this Task Order. This document and its appendices fill that role.

This Installation-Wide Work Plan (IWWP) provides descriptions of common field activities that are likely to be implemented at one or more sites during AECOM's performance of Task Order DS01. These descriptions are meant to be generally applicable and thus eliminate the need for repeatedly describing these activities in site-specific work plans. However, site-specific work plans will be issued as AECOM deems necessary to address:

- The locations and rationale of activities within specific sites
- Significant deviations from the proposed approach presented in the Project Management Plan (PMP)
- Modifications of the activities described in this IWWP
- Specialized technologies not described in this IWWP
- Health and safety and quality control (QC) issues associated with modified activities or specialized technologies

LHAAP is an inactive, government-owned, formerly contractor-operated and maintained Department of Defense facility located in central-east Texas. Extensive demolition and salvaging of materials has occurred at LHAAP, but there are still portions of buildings remaining. The entire installation was under the control of the U.S. Department of the Army (U.S. Army) until May 5, 2004, when approximately two thirds of the property was transferred to the U.S. Fish and Wildlife Service (USFWS). Additional property has been transferred to USFWS since then and the property transfer process will continue as remediation and characterization activities are completed at additional sites. The U.S. Army Environmental Center has the responsibility for the environmental restoration activities at LHAAP, with the management of the U.S. Army's property provided by the Base Realignment and Closure Office.

The groundwater, surface water, sediment, and soil at LHAAP have been contaminated by past operations. Studies conducted at LHAAP identified contaminants such as volatile organic compounds, heavy metals, perchlorate, and explosives in on-site media. Several areas of contamination are subject to investigation and cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (42 U.S. Code 9604).

The field activities described in this IWWP are potentially applicable to any of the LHAAP sites addressed by the task order. Those sites are listed in **Table 1-1**. The PMP (AECOM, 2012) provides a description of the proposed approach at each site.

This IWWP is composed of the following sections:

- **Section 2**, "Location," summarizes the facility description, background and setting of LHAAP.
- **Section 3**, "Common Field Activities," describes field activities such as sampling and excavation that are expected to be implemented at several project sites.
- **Section 4**, "Health and Safety," introduces AECOM's safety culture and the installation-wide Health and Safety Plan (HASP).
- **Section 5**, "Quality Assurance/Quality Control," discusses general quality assurance (QA)/QC processes and introduces the installation-wide Quality Assurance Project Plan (QAPP).
- **Section 6**, "References," presents a listing of the references cited in this document.

This IWWP is supported by a number of installation-wide planning tools. These tools are presented in the following appendices:

- **Appendix A Health and Safety Plan**
- **Appendix B Quality Assurance Project Plan**
- **Appendix C Project Operating Procedures**

Table 1-1: Sites Addressed By Task Order DS01

Site Name	Brief Description
LHAAP-03	Building 722 Paint Shop
LHAAP-04	Pilot Wastewater Treatment Plant
LHAAP-12	Landfill 12 (solid waste management unit [SWMU] 12)
LHAAP-16	Old Landfill (SWMU 16)
LHAAP-17	No. 2 Flashing Area/Burning Ground (SWMU 17)
LHAAP-18	Burning Ground/Washout Pond (SWMU 18) *Note: This site is grouped with LHAAP-24*
LHAAP-24	Former Unlined Evaporation Pond (SWMU 24) *Note: This site is grouped with LHAAP-18*
LHAAP-29	Former TNT Production Area (SWMU 29)
LHAAP-37	Chemical Laboratory Waste Pad *Note: This site was previously LHAAP-35B*
LHAAP-46	Plant 2/Pyrotechnic Operation
LHAAP-47	Plant 3 Area, Solid Rocket Fuel Motor Production
LHAAP-50	Former Waste Disposal Facility
LHAAP-58	Maintenance Complex *Note: This site was previously LHAAP-35A*
LHAAP-67	Above Ground Storage Tanks
LHAAP-001-R-01	South Test Area / Bomb Test Area
LHAAP-003-R-01	Ground Signal Test Area

2 LOCATION

2.1 Site Location

LHAAP is located in central-east Texas in the northeastern corner of Harrison County. The footprint of the former U.S. Army installation occupies 8,416 acres between State Highway 43 at Karnack, Texas, and the southwestern shore of Caddo Lake, as shown in **Figure 2-1**. To date, approximately 7,000 of the 8,416-acre installation have been transferred to USFWS for management as the Caddo Lake National Wildlife Refuge. The U.S. Army intends to transfer the remaining property to the USFWS after the environmental response is completed.

The nearest cities are Marshall, Texas, approximately 14 miles to the southwest, and Shreveport, Louisiana, approximately 40 miles to the southeast. Caddo Lake, a large freshwater lake situated on the Texas-Louisiana border, bounds LHAAP to the north and east.

2.2 History

LHAAP was established in December 1941, near the beginning of World War II, when the U.S. Army issued a contract to build a six-line production facility for manufacturing trinitrotoluene (TNT) (Plant 1 Area). The first flake of TNT was produced in October 1942. LHAAP ultimately produced 414 million pounds of TNT before production was halted in August 1945, near the end of the war, and the facility went on standby status.

In 1952, during the Korean War, the government undertook two new initiatives at LHAAP:

- A partially-constructed facility (Plant 2) was reactivated and refitted for pyrotechnics production. This facility produced 3.4 million pyrotechnic devices (e.g., photoflash bombs, simulators, hand signals, and 40 millimeter tracers) before production was discontinued in April 1956.
- A facility (Plant 3) was designed and built for producing solid-fuel rocket motors for tactical missiles. Actual rocket motor production began in December 1954. The last major propellant-loading activity in Plant 3 occurred in 1980. Over the intervening quarter century, LHAAP manufactured over 50 million pounds of composite propellant and delivered over 200,000 rocket motors.

Production of rocket motors continued to be the primary operation at LHAAP until 1965 when, due to the Vietnam conflict, Plant 2 was reactivated for the production of pyrotechnic and illuminating ammunition. In the years following Vietnam, LHAAP continued to produce flares and other basic pyrotechnic or illuminating items for the U.S. Department of Defense inventory. From September 1988 to May 1991, LHAAP was also used for the static firing and elimination of Pershing I and II rocket motors in compliance with the Intermediate-Range Nuclear Force (INF) Treaty in effect between the U.S. and the former Union of Soviet Socialist Republics.

Various media in certain areas have been contaminated by past industrial operations and waste management practices at LHAAP. Industrial operations involved the use of secondary explosives, rocket motor propellants, and various pyrotechnics, such as illuminating and signal flares and ammunition. Explosives included TNT and black powder. Typical composite propellants were composed of a rubber binder, an oxidizer such as ammonium perchlorate, and a powdered metal fuel such as aluminum. Pyrotechnics were generally composed of an inorganic oxidizer such as sodium nitrate, a metal powder such as magnesium, and a binder. Other

materials used in the industrial operations included acids, lubricants, and solvents; particularly trichloroethene and methylene chloride. Waste management included sanitary wastewater treatment, industrial wastewater treatment, holding/evaporation ponds, storm water drainage, sanitary and industrial waste landfills, and demolition/burning grounds. Discharges and releases to surface water, groundwater, and other secondary media have occurred from the historical operations.

LHAAP was placed on the National Priorities List on August 9, 1990. A Federal Facility Agreement among the U.S. Army, the U.S. Environmental Protection Agency, and the Texas Natural Resources Conservation Commission, now the Texas Commission on Environmental Quality (TCEQ), became effective December 30, 1991. LHAAP became inactive in July 1997, with the U.S. Army issuing a contract to remove salvageable property a year later. On May 5, 2004, the U.S. Army transferred control of approximately 5,032 acres of land to the USFWS. The Remedial Investigation (RI), Feasibility Study, Remedial Design, Remedial Action (RA) process is continuing at the Group 2 and Group 4 sites with the land still under the U.S. Army's control. Those sites covered by this IWWP are presented in **Figure 2-2**.

2.3 Physical Setting

The LHAAP location is characterized by a mild climate with an average low temperature of 35 degrees Fahrenheit (ºF) and an average high of 91ºF. Precipitation averages 46.9 inches per year with a slight peak in the spring. LHAAP is in an area of mixed pine-hardwood forests that cover flat to gently rolling terrain. Most of the terrain at LHAAP has an average slope of 3 percent or less, but slopes as steep as 12 percent can be found in the western and northwestern portions of the installation and along Harrison Bayou.

LHAAP is a part of the Cypress Bayou Basin occurring in the Piney Woods ecological region of Texas. The gentle topography and mild climate support an abundant and diverse plant community with a diversity of habitats. This diversity suggests the potential for a large variety of animal species to inhabit LHAAP. As the buildings have been demolished, more and more of the facility has been left to nature with pine trees growing among concrete remnants. Common mammals found at LHAAP include white-tailed deer, red and gray foxes, rabbits, squirrels, opossums, skunks, armadillos, beavers, and raccoons. In addition to mammals, a total of 334 bird species have been documented as inhabiting Caddo Lake's drainage system and potentially inhabiting LHAAP sometime during the year. A reported 53 different reptile species inhabit the Cypress Bayou Basin.

Surface water at LHAAP drains to the northeast into Caddo Lake, part of Big Cypress Bayou, via four drainage systems **(Figure 2-2)**: Saunder's Branch, Harrison Bayou, Central Creek, and Goose Prairie Creek. Saunder's Branch of Martin's Creek flows onto LHAAP near the southeastern corner of the installation and flows northward into Caddo Lake. Approximately 10 percent of the heavily-wooded eastern section of the former plant footprint is drained by this system. Harrison Bayou enters LHAAP on the southern edge of the installation. The bayou captures approximately 30 percent of the surface drainage of LHAAP and bisects the installation in a northeasterly direction. Central Creek enters LHAAP on its western edge, just south of the town of Karnack. Approximately 30 percent of the surface drainage from the installation is transported to Caddo Lake via this drainage course. The headwaters of Goose Prairie Creek are located near the northwestern corner of the former plant footprint and consist of one larger creek and several smaller tributaries. Goose Prairie Creek flows across the northern edge of the

installation and drains approximately 30 percent of LHAAP. The flows of Central Creek and Goose Prairie Creek are intermittent.

The subsurface geology at LHAAP consists of a thin veneer of Quaternary alluvium overlying Tertiary age rocks of the Wilcox and Midway Groups. Underlying these sediments are Cretaceous age rocks of the Navarro and Taylor Groups.

The stratigraphic thickness of the uppermost Wilcox Group ranges from a maximum of 350 feet in the northwest corner of LHAAP to approximately 130 to 140 feet along the east side of the facility near Caddo Lake. The Wilcox Group constitutes the majority of the unconsolidated sediments underlying LHAAP. The Wilcox Group consists of interbedded sands, silts, and clays. These sediments were deposited along flood plains and in lakes and swamps on a wide, flat coastal plain traversed by shifting streams. This type of depositional environment resulted in the extreme variability and discontinuity of the sediments observed in the Wilcox Group beneath the site.

The unconsolidated sediments of the Wilcox Group generally consist of three sandy, water-bearing zones separated by silty clay layers. The uppermost portion of the Wilcox Group at LHAAP consists of medium plastic sandy silts and clays ranging in thickness from approximately five to 15 feet. These surficial sediments are underlain by the first or "shallow" saturated sand zone, which ranges in thickness from 10 to 20 feet. This sand zone consists of silty fine sand containing some silt and clay lenses and is at first dry to moist and then generally becomes saturated at 15 to 20 feet below ground surface (bgs). A five to 20 foot thick medium to highly plastic silt and clay layer underlies the shallow saturated sand zone. An intermediate saturated sand zone, consisting of fine to medium silty sand, is then encountered below the silty clay layer at 30 to 50 feet bgs. The intermediate saturated sand zone is generally less silty than the shallow saturated sand zone and exhibits higher hydraulic conductivity. A silt to silty clay layer is encountered beneath the intermediate saturated sand zone and ranges in thickness from five to 30 feet. Underlying this silt to silty clay layer, a massive homogeneous silty, clayey, fine sand layer is encountered at a depth that continues to the top of the underlying Midway Group (approximately 200 to 300 feet bgs).

Because of the high degree of stratigraphic heterogeneity, the level of interconnection between the shallow, intermediate, and deep water-bearing zones in the Wilcox Group deposits at LHAAP is highly variable. The depth to groundwater across the facility ranges from one to 70 feet bgs, with the typical depth at 12 to 16 feet. The regional groundwater flow direction is generally east-northeast towards Caddo Lake, but varies by site location.

Additional geologic and hydrogeologic information is included in RI reports (Jacobs, 2001 and 2002).

2.4 Current and Future Land Uses

LHAAP is located near the unincorporated community of Karnack, Texas. Karnack is a rural community with a population of approximately 2,500 people (http://zipcode.org/city/tx/karnack). The incorporated community of Uncertain, Texas, population less than 100 (http://www.city-data.com/city/Uncertain-Texas.html), is a resort area located to the northeast of LHAAP on the edge of Caddo Lake and an access point to Caddo Lake. The industries in the surrounding area consist of agriculture, timber, oil and natural gas production, and recreation.

The majority of the former LHAAP footprint is now under USFWS management as the Caddo Lake National Wildlife Refuge. The remainder is managed by the U.S. Army and continues to undergo environmental investigation and remediation with the ultimate goal of all property being transferred to USFWS for use as a wildlife refuge.

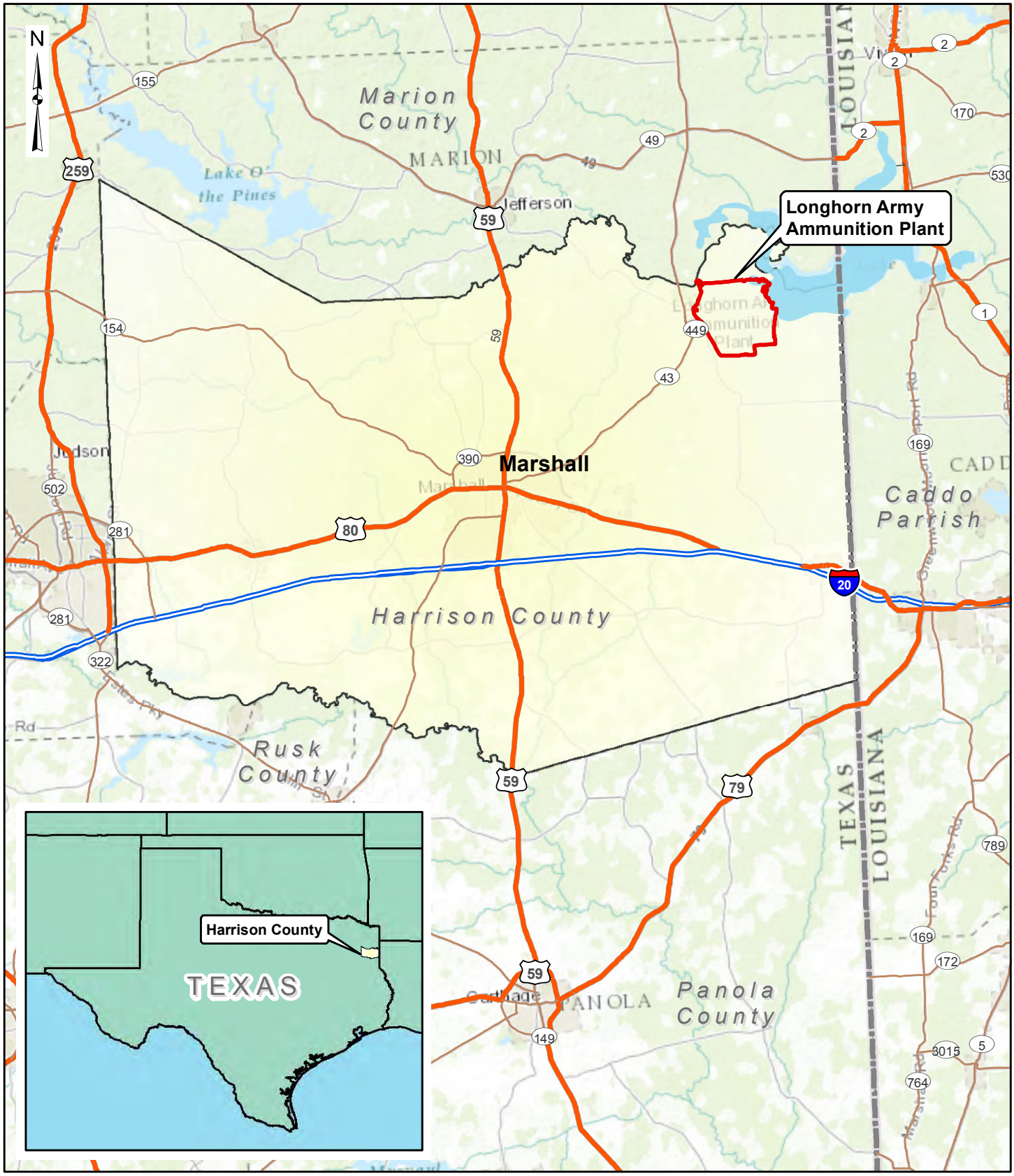

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Figure 2-1
LHAAP Location Map

Longhorn Army Ammunition Plant
Karnack, Texas

60256135

July 2013

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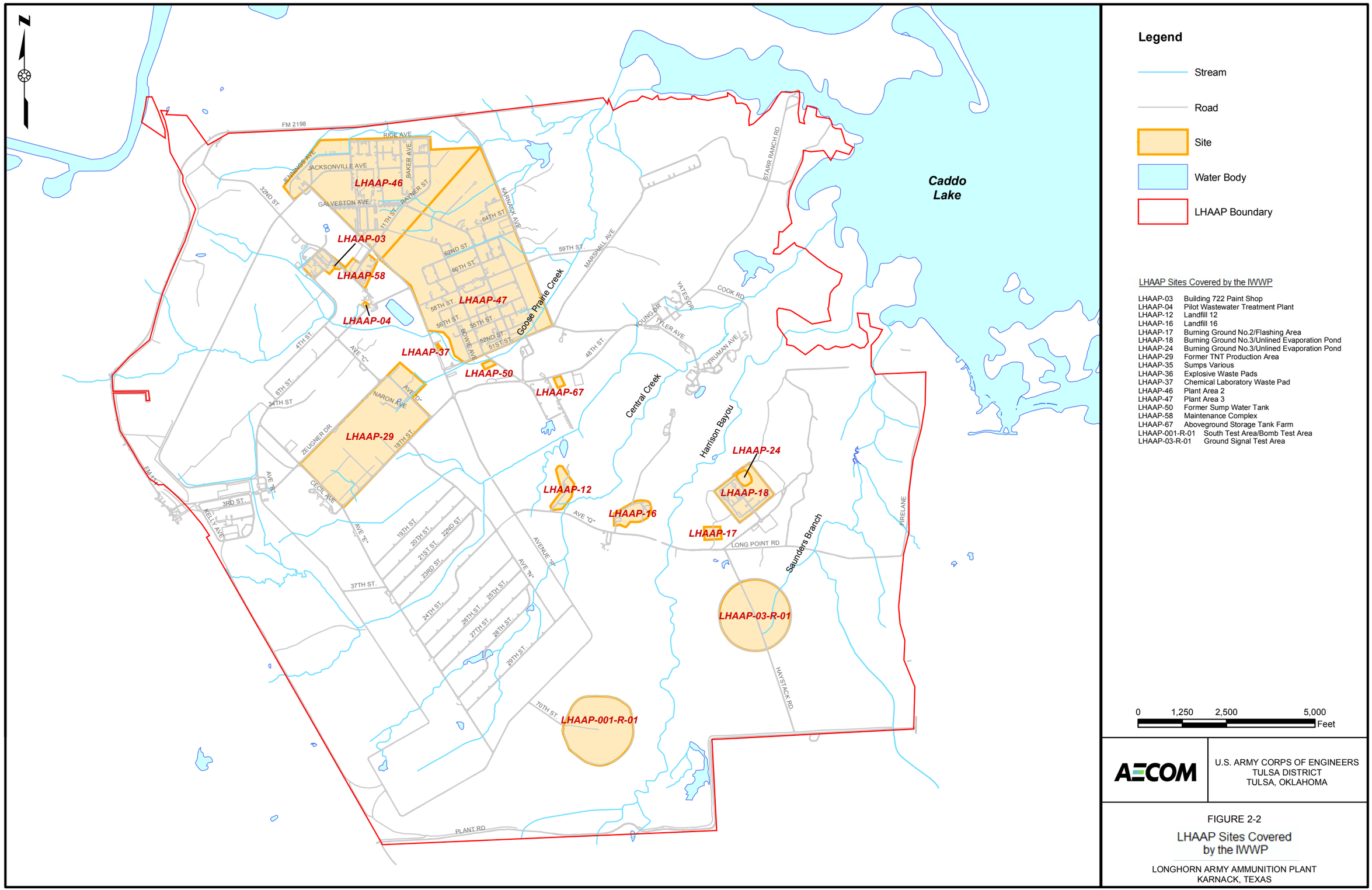

AECOM

U.S. ARMY CORPS OF ENGINEERS
TULSA DISTRICT
TULSA, OKLAHOMA

FIGURE 2-2

LHAAP Sites Covered by the IWWP

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

3 COMMON FIELD ACTIVITIES

3.1 Site Activities by Task Order

Planned remediation activities at LHAAP's various sites include several primary common tasks that are described here.

- Task 1 Mobilization and Site Setup
- Task 2 Monitoring Well/Compliance Well Installation
- Task 3 Survey of Monitoring Well Locations
- Task 4 Groundwater Sampling
- Task 5 Soil Sampling
- Task 6 Surface Water/Sediment Sampling
- Task 7 Investigation-Derived Waste Management
- Task 8 Soil Excavation and Disposal
- Task 9 Well Abandonment

Additional information regarding these tasks can be found in **Appendix B, Quality Assurance Project Plan** and **Appendix C**, **Standard Operating Procedures**. The standard operating procedures described in this document are generally consistent with those employed previously at the site.

For use in conjunction with this IWWP, site-specific/project-specific work plans will be generated and used as needed. Those site-specific work plans will define the specific locations where common field activities will be conducted and will describe the implementation of remedial activities including remediation techniques unique to specific sites.

3.2 Task 1 – Mobilization and Site Setup

Prior to the mobilization of subcontractors to LHAAP sites, AECOM will examine work locations for overhead and ground level accessibility. In areas that have excessive vegetation and/or tree growth, a backhoe or other appropriate earth moving equipment will be used to clear the areas to allow equipment access. After coordinating with underground utility locators for utility clearances, drilling locations and areas that require surface soil removal will be located and staked. Additional guidance for underground utility clearance is contained in Attachment 14-Underground Utility Clearance of **Appendix C**.

AECOM will mobilize appropriate personnel, subcontractors, and equipment necessary to perform specific task(s). A permanent decontamination station is located at the on-site ground water treatment plant (GWTP) at LHAAP-18/24 and can accommodate large equipment. Temporary decontamination pads will be constructed as needed at approved on-site locations to decontaminate equipment and prevent cross-contamination between sites. Wash water will be contained and transported to the GWTP for disposal when necessary.

3.3 Task 2 – Monitoring Well/Compliance Well Installation

Monitoring and compliance wells will typically be drilled and installed using a hollow stem auger rig. Certain site conditions, including flowing sands, are present at LHAAP and may require wet rotary drilling techniques. Each well will be constructed with flush-joint threaded, schedule 40, polyvinyl chloride (PVC). If necessary, soil samples will be collected continuously using a sampler advanced ahead of the drill bit. The soil (or sediment) samples will be described according to American Society for Testing and Materials (ASTM) D2488-09a, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 2009), and logged on USACE Engineering Form 1836 (Drilling Log) or equivalent. Additional guidance for well installation is found in Attachment 12-Monitoring Well Installation Procedures of **Appendix C**.

The monitoring wells will be installed in the annulus of hollow-stem augers or open hole depending on the drilling methodology. The PVC well screen for each well will be constructed with 0.01 inch slots and will typically be 10 feet in length. A threaded PVC bottom cap will be secured to the bottom of the screen interval. Solid PVC casing will be installed from the top of the screen interval to approximately three feet above surface grade. A filter pack consisting of clean silica sand (20 to 40 size) will be placed in the auger-well annulus from the well bottom to approximately two feet above the screen interval. A three foot thick bentonite seal (pellets or chips) will be placed above the sand filter pack and hydrated with portable water. The annular space form the top of the bentonite seal to the surface will be filled with a bentonite-cement grout. The screen length and sealing criteria may be adjusted on a site-specific basis.

For the wells installed in the deeper groundwater zones, the shallower groundwater zones will be isolated using a suitable diameter, schedule 40 PVC casing. The casing will be installed from near surface grade to the top of the first confining layer. Upon grouting and setting of the isolation casing, drilling will proceed into the deeper zone.

The drilling equipment will be decontaminated prior to the arrival at the site and between wells. Upon completion of drilling activities the drilling equipment will be decontaminated prior to demobilizing and leaving the installation. Additional guidance on decontamination procedures can be found in Attachment 9-Decontamination of Field Equipment of **Appendix C**. Core samplers will be decontaminated between sampling intervals with a detergent/water solution and multiple rinse stages in clean buckets. The decontamination wastewater and drill cuttings will be placed in appropriate containers (e.g., 55 gallon drums, roll-off bins) and handled as described in Task 7, below.

Well surface completions will be constructed for each monitoring/compliance well installed. Surface completion will consist of protective steel casing, with a hinged, lockable lid set in a concrete pad. Concrete-filled steel bollards will be installed at the corners of the concrete pad.

The monitoring wells and surface completions will be installed in general accordance with USACE and State of Texas requirements by a drilling subcontractor licensed in the State of Texas. Monitoring wells shall comply with applicable technical requirements of 30 Texas Administrative Code (TAC) Chapter 76. State of Texas Well Reports will be submitted to the Texas Department of Licensing and Regulation for each well.

3.3.1 Well Development

The newly installed monitoring wells will be developed to remove drilling fines and enhance hydraulic communication between the well and the groundwater zone. The wells will be developed no sooner than 48 hours, and no later than seven days, after installation (grouting) of the well. Well development will typically be performed by pumping and gentle surging of the screened interval using a rubber-lined surge block. A minimum of three well borehole volumes of water will be removed. The volume of groundwater removed from each well will be calculated from the static water level measurement referenced from the top-of-casing. An electronic interface probe will be used to measure the water levels. As an alternative to pumping, a bottom-filling bailer may be used to remove water from low-yielding wells. Water quality parameters (temperature, hydrogen ion concentration [pH], conductivity, and turbidity) of the development discharge water will be monitored. Development will continue until the water quality parameters have stabilized and the water is visually clear. Detailed well development guidance is provided in Attachment 3-Monitoring Well Development of **Appendix C**.

An AECOM geologist will supervise well development, and document the development process and measurements in a Well Development Record specific to each well. Downhole development equipment will either be disposed after each use or will be decontaminated prior to and following use at each well location by cleaning in a detergent/water solution and multiple rinse stages in clean buckets. The development and decontamination wastewater will be placed in 55 gallon drums or other appropriate containers and handled as described in **Section 3.8**.

3.4 Task 3 - Surveying

A professional land surveyor licensed in the State of Texas will survey the locations and elevations of the newly installed monitoring wells. The horizontal coordinates (northing and easing) of the wells will be surveyed to the nearest foot and will be based on the North American Datum of 1983. The vertical elevations of the top of the wells (top-of-casing) will be based on the North American Vertical Datum of 1988 and will be surveyed to the nearest 0.01 feet at a reference point (i.e., groove or marking on the north side of the well casing) used to collect water level measurements as described in Attachment 4-Water Level Measurements of **Appendix C**.. The ground surface elevation at each well location will be surveyed to the nearest 0.1 feet. To ensure compatibility with pre-existing well elevations, the top-of-casing for one of the existing wells at each site will be surveyed. If discrepancies are noted, the USACE will be consulted for resolution.

For identifying locations of soil confirmation samples and limits of excavation, either land surveying or global positioning system (GPS) may be used. AECOM will coordinate with the USACE prior to the use of GPS.

3.5 Task 4 – Groundwater Sampling

Monitoring wells will be sampled using low-flow techniques. The only exceptions would be slow recharging wells that go dry or proceed to drawdown significantly and cannot achieve equilibrium. Procedures for purging and sampling the monitoring wells with the low flow method or alternative means are detailed in Attachment 2-Groundwater Sampling of **Appendix C**. Detailed information on groundwater sampling can also be found in the QAPP (**Appendix B**). Analytical parameters and the frequency of sampling will be discussed in site-specific work plans.

3.6 Task 5 – Soil Sampling

Surface soil is defined as that which exists from the land surface extending approximately one foot bgs. Surface soil samples may be collected during various investigation or remediation activities. Surface soil sampling equipment and procedures are detailed in Attachment 6-Surface Soil Sampling of **Appendix C**.

Subsurface soil samples may be collected during various activities including drilling of soil borings, test pits, or installation of monitoring wells for investigation activities. Soils samples collected during drilling activities will be described in general accordance with ASTM D2488-09a, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Each boring will be logged on USACE Engineering Form 1836 (Drilling Log) or equivalent. Where appropriate, soil samples will be screened using an organic vapor analyzer and headspace readings recorded on the boring log. Samples will be collected in accordance with site-specific work plans. More information regarding subsurface soil samples can be found in Attachment 5-Subsurface Soil Sampling by Split Spoon and Continuous Split Barrel Samplers of **Appendix C**. Information regarding the collection and field screening of soil samples can be found in Attachment 1-Collection and Field Screening of Soil Samples of **Appendix C**.

Test pits may be installed at the facility to fulfill specific objectives relating to site investigations or for confirmation purposes. Generally, test pits will be utilized in order to identify the location of pipelines, the condition of pipelines, and to characterize the surrounding soil to determine if there have been any impacts to the soil during past operations. Additional procedural criteria and sampling protocols will be defined in site specific work plans covering work where test pitting is a planned activity.

3.7 Task 6 – Surface Water/Sediment Sampling

During various phases of work, surface water and sediment samples may be collected to satisfy specific requirements. Sampling equipment may be utilized depending on sample objectives and site conditions (e.g., Kemmerer samplers, etc.). Detailed guidance regarding surface water sampling can be found in Attachment 7-Surface Water Sampling of **Appendix C**.

Sediment samples are usually collected in conjunction with a surface water sample, and as close as possible to the location the surface water sample. As with other media, samples should first be collected from the point suspected to be the least contaminated and later from more contaminated points to minimize the risk of cross-contamination (e.g., collection near a pipe outfall should not be the first sample if several samples are planned for the water body). Detailed guidance regarding sediment sampling can be found in Attachment 6-Surface Soil Sampling of **Appendix C**.

3.8 Task 7 – Investigation-Derived Waste Management

Environmental investigation activities can include monitoring well installation, groundwater sampling, soil sampling surface water/sediment sampling, soil excavation, and well abandonment. Wastes generated while conducting these activities can include soil cuttings, waste water, soil piles, personal protective equipment (PPE), sampling equipment, well materials, and miscellaneous trash. Management of the waste streams is described below.

3.8.1 Drill Cuttings

Drill cuttings may initially be placed in 55 gallon drums or similar containers, or directly placed in a high-density polyethylene (HDPE)-lined roll-off container. Upon completion of each soil boring, drums will be sealed and transported to a staging area. Drill cuttings in drums will be transferred to an HDPE-lined roll-off container if the quantity of drill cuttings is large. Composite samples will be collected from drums or roll-off boxes for characterization before disposal. The procedures for sampling the drill cuttings in drums or roll-offs are detailed in the QAPP (**Appendix B**). Handling of investigation-derived waste is described in Attachment 10-Investigation Derived Waste of **Appendix C**.

Following characterization, drill cuttings may be disposed on site if they are determined to be non-hazardous. Typically, cuttings will be transported to a permitted landfill if they are determined to be hazardous or containing listed waste.

3.8.2 Wastewater

Wastewater generated from equipment decontamination, well development, sampling, and purging activities will be stored in 55 gallon drums or larger containers. Containers will be transported to the GWTP at LHAAP-18/24 for disposal by addition to the influent stream of the plant.

3.8.3 Miscellaneous Wastes

Miscellaneous wastes include spent PPE, HDPE sheeting, rags, paper towels, etc. These wastes will not be characterized and will be placed in plastic bags for disposal as municipal solid waste.

3.9 Task 8 – Soil Excavation and Disposal

At excavations with sufficient soil analytical results, AECOM may decide to coordinate with the selected disposal facility to evaluate the potential for pre-excavation acceptance of the soil by the facility. Pre-excavation acceptance will allow direct loading of contaminated soil and thus avoid staging and double-handling of material. In these instances, the soil will be removed from the excavation and placed directly in transport trailers for immediate transport to the disposal facility.

For sites not compatible with direct loading operations, excavated soils will typically be staged at the site and sampled for waste characterization and profiling. The process of staging and handling waste soil will depend on expected contaminant concentrations and soil volumes. If it is necessary to excavate clean soil, an attempt will be made to segregated clean soil from soil that is expected to exceed site-specific cleanup levels. For soil exceeding site-specific cleanup levels, assumed hazardous soils will be staged separately from assumed non-hazardous soils. The staging of contaminated soil will typically be performed as follows:

- Material from small excavations (less than approximately 200 in-place cubic yards) will be placed directly in roll-off containers. If the excavated material is expected to be characteristically hazardous waste or if listed hazardous wastes are expected to be present, the containers will be lined. The containers will be maintained in a designated staging area at the remediation site while waste characterization samples are analyzed. The containers will be covered by tarps while awaiting disposition.

- Construction sites greater than one acre in size, including excavation and other earthwork activities related to RAs are subject to the storm water pollution prevention requirements of Chapter 26 of the Texas Water Code and TCEQ General Permit TXR15000. Material generated from large excavations will be placed in daily piles while awaiting waste characterization analyses. The soil piles will be placed in designated contaminated-soil staging areas adjacent to the excavations. A staging area will be underlain by two layers of six millimeter polyethylene; additional soil will be spread atop the polyethylene to minimize damage from heavy equipment and trucks. Soil in the staging area will be protected from surface water run-on by construction of temporary berms to divert potential run-on away from the area. The soil piles will be covered after each day with polyethylene sheeting to minimize the potential for contaminated dust generation and deposition during windy conditions, and to reduce exposure to rain and run off. As necessary, a site-specific plan addressing appropriate storm water control measures and/or fugitive dust control measures will be established prior to any soil excavation, staging activities, or other RAs involving earthwork in accordance with applicable regulations.

Composite samples will be collected from staged material as required to gain acceptance at specified disposal facilities. Each composite sample will consist of equal parts of five samples collected at evenly spaced locations within the stockpile. The composite sample will be analyzed for constituents and properties according to the selected disposal facility requirements. The procedures for collecting composite samples are described in the QAPP, **Appendix B**.

The fully-characterized excavation stockpile soil will be removed from the site for proper disposal in accordance with state and federal regulations.

3.10 Task 9 – Well Abandonment

Well abandonment will be conducted in accordance with 30 TAC 76.1004 and 30 TAC 76.1005 as applicable, by a Texas-licensed driller. The abandonment procedures used at a site are dependent upon specific regulatory requirements and generally fall into two different methods: abandonment of the well in place; or complete removal of the well and associated materials from the aquifer. Abandonment in place will typically be utilized when cross-contamination between water-bearing zones is not a concern. In other circumstances, removal of the well materials will be implemented by over-drilling the well casing. Well abandonment reports and notices required by the Texas Water Development Board and Texas Department of Licensing and Regulation will be submitted upon abandonment.

Several goals should be met while conducting well abandonment activities. These include the prevention of vertical migration of fluids in the borehole and prevention of intermixing of waters from different water-bearing zones. In addition, any physical hazards that may be present, such as an open borehole, should be eliminated after conducting well abandonment procedures. Lastly, well abandonment activities should be conducted in such a way to preserve aquifer properties. Additional guidance is provided in Attachment 11-Monitoring Well and Boring Abandonment Procedures of **Appendix C.**

3.11 Other Remediation Tasks

For tasks not otherwise described in this IWWP, site-specific work plans will be issued that will specifically address a site and the scope of work that will be required for that site. Examples of tasks that could be addressed in site-specific work plans include the following:

1. Biobarrier installation
2. Groundwater pump and treat operations
3. Soil excavation
4. GWTP optimization and effluent reinjection
5. Soil and groundwater flushing
6. Enhanced in-situ bioremediation
7. In-situ chemical oxidation
8. Piping remediation
9. Test pits

3.12 Site Restoration and Demobilization

Following completion of remediation activities, AECOM will restore the site and demobilize. Disturbed areas will be graded for proper drainage, if necessary. Revegetation of disturbed areas will be with native vegetation where possible. Equipment and personnel will be demobilized from the project site immediately following completion of field operations. Equipment will be decontaminated before leaving the site.

4 HEALTH AND SAFETY

4.1 HASP

The HASP defines and establishes the policies and procedures that protect workers and the public from potential hazards posed by planned project activities during this installation-wide investigation and remediation effort at LHAAP. The HASP incorporates health and safety policies and safe operating procedures for individual project site activities proposed under this contract. These procedures allow work activities to be carried out in a controlled, effective manner, consistent with AECOM policies.

Prior to initiating work at the facility for any site, workers will sign the HASP acknowledgement page to indicate they have read and understood the document. Also, daily safety meetings will be held with all field crew members prior to starting work each day in order to review the day's scope of work, any site conditions expected, and any hazards that need to be addressed or acknowledged. The HASP is provided as **Appendix A**.

Each site-specific work plan will include a section on Health and Safety. That section will address hazards that are not addressed by this IWWP because the hazards are unique to the site or associated with specialized technologies dealt with in the site-specific work plan.

5 QUALITY ASSURANCE/QUALITY CONTROL

5.1 Quality Assurance Project Plan

The QAPP in **Appendix B** provides additional information on QA/QC procedures. This plan identifies personnel, procedures, controls, instructions, tests, verifications, documents, and forms to be used and what type of records to be maintained. The USACE Three-Phase QC process will be used to enforce QA/QC requirements and include preparatory inspections, initial inspections, and follow-up inspections. The three phases of inspections will target each definable feature of work during execution of project activities.

AECOM will coordinate with the USACE to meet the requirements of the Quality Assurance Surveillance Plan (QASP). The QASP, developed by the USACE, incorporates key QC activities that the USACE will use to assess progress toward milestones as described in the Performance Work Statement.

Each site-specific work plan generated to guide activities not covered in this IWWP will include a section on QC. That section will address QC requirements specific to any specialized technologies that are being applied but not addressed by this IWWP.

6 REFERENCES

AECOM Technical Services, Inc. (AECOM), 2012, *Final Project Management Plan for Longhorn Army Ammunition Plant, Karnack, Texas*, August.

ASTM International (ASTM), 2009, ASTM D2488-09a, *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)*.

Jacobs Engineering Group (Jacobs), 2001, *Final Remedial Investigation Report for the Group 2 Sites (Sites 12, 17, 18/24, 29, and 32) at Longhorn Army Ammunition Plant, Karnack, Texas,* St. Louis, Missouri, April.

Jacobs, 2002, *Final Remedial Investigation Report Volume 1: Report for the Group 4 Sites, Sites 35A, 35B, 35C, 46, 47, 48, 50, 60, and Goose Prairie Creek, Longhorn Army Ammunition Plant, Karnack, Texas*, Oak Ridge, Tennessee, January.

Appendix A: Health and Safety Plan

FINAL
HEALTH AND SAFETY PLAN
FOR
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM Technical Services

February 2014

FINAL
HEALTH AND SAFETY PLAN
FOR

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corp of Engineers

Tulsa District

Prepared By:

AECOM Technical Services

Contract No. W912DY-09-D-0059

Task Order No. DS01

February 2014

HEALTH AND SAFETY PLAN APPROVAL

This Health and Safety Plan (HASP) was prepared for employees performing a specific, limited scope of work. It was prepared based on the best available information regarding the physical and chemical hazards known or suspected to be present on the project site. While it is not possible to discover, evaluate, and protect in advance against all possible hazards, which may be encountered during the completion of this project, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury.

By signing below, I acknowledge that I have reviewed and hereby approve the HASP for the Longhorn Army Ammunition Plant (LHAAP) site. This HASP has been written for the exclusive use of AECOM, its employees, and subcontractors. The plan is written for specified site conditions, dates, and personnel, and must be amended if these conditions change.

Approved by:

Daniel Schillings, REM
District Safety Manager
(210) 253-7567

July 1, 2013
Date

Concurrence by:

David Wacker
Project Manager
(210) 253-7514

July 1, 2013
Date

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ACRONYMS AND ABBREVIATIONS

^{o}C	degrees Celsius
^{o}F	degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienists
AECOM	AECOM Technical Services, Inc.
ANSI	American National Standards Institute
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIH	Certified Industrial Hygienist
CFR	Code of Federal Regulations
CRZ	Contaminant Reduction Zone
EAP	Emergency Action Plan
EZ	Exclusion Zone
GFCI	ground fault circuit interrupter
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high efficiency particulate air
IDLH	immediately dangerous to life or health
IDW	investigative-derived waste
LEL	lower exposure limit
LHAAP	Longhorn Army Ammunition Plant
LTM	Long-Term Monitoring
mg/m^3	milligrams per cubic meter
mm	millimeter
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OTC	over-the-counter
PEL	permissible exposure limit
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
RA(O)	Remedial Action (Operations)

REL	recommended exposure limit
RfC	reference concentration
SDS	Safety Data Sheet
SH&E	Safety, Health, and Environmental
SOP	Standard Operating Procedure
SOW	Statement of Work
SP	Safety Professional
SPF	solar protection factor
SSHO	Site Safety and Health Officer
SZ	Support Zone
TCEQ	Texas Commission on Environmental Quality
TLV	threshold limit value
TNT	trinitrotoluene
U.S.	United States
U.S. Army	U.S. Department of the Army
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UV	ultraviolet
VOC	volatile organic compound
WHMIS	Workplace Hazardous Materials Information System

1.0 INTRODUCTION

This Health and Safety Plan (HASP) (including Attachments A through F) provides a general description of the levels of personal protection and safe operating guidelines expected of each employee or subcontractor associated with the environmental services being conducted at Longhorn Army Ammunition Plant (LHAAP), located in Karnack, Texas. This HASP also identifies chemical and physical hazards known to be associated with the AECOM Technical Services, Inc. (AECOM)-managed activities addressed in this document.

HASP Supplements will be generated as necessary to address any additional activities or changes in site conditions, which may occur during field operations.

1.1 GENERAL

The provisions of this HASP are mandatory for all AECOM personnel engaged in fieldwork associated with the environmental services being conducted at the subject site. A copy of this HASP, any applicable HASP Supplements and the United States (U.S.) Operations Safety, Health, and Environmental (SH&E) Manual shall be maintained on-site and available for review at all times. Record keeping will be maintained in accordance with this HASP and the applicable Standard Operating Procedures (SOPs). In the event of a conflict between this HASP, the SOPs and federal, state, and local regulations, workers shall follow the most stringent/protective requirements.

1.2 POLICY STATEMENT

It is the policy of AECOM to provide a safe and healthy work environment for all of its employees. AECOM considers no phase of operations or administration is of greater importance than injury and illness prevention. Safety takes precedence over expediency or shortcuts. At AECOM, we believe every accident and every injury is avoidable. We will take every reasonable step to reduce the possibility of injury, illness, or accident. This is detailed in AECOM's *Safety, Health, and Environmental Policy Statement*.

The practices and procedures presented in this HASP and any supplemental documents associated with this HASP are binding to all AECOM employees while engaged in the subject work. Operational changes to this HASP and supplements that could affect the health or safety of personnel, the community, or the environment will not be made without prior approval of the AECOM Project Manager (PM) and the assigned AECOM Safety Professional.

1.3 REFERENCES

This HASP conforms to the regulatory requirements and guidelines established in the following documents:

- Title 29, Part 1910 of the Code of Federal Regulations (CFR) (29 CFR 1910), *Occupational Safety and Health Standards* (with special attention to Section 120, *Hazardous Waste Operations and Emergency Response*)
- 29 CFR 1926, *Safety and Health Regulations for Construction*
- National Institute for Occupational Safety and Health (NIOSH)/Occupational Safety and Health Administration (OSHA)/U.S. Coast Guard (USCG)/U.S. Environmental Protection Agency (USEPA), *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, Publication No. 85-115, 1985
- American National Standards Institute (ANSI), *American National Standard for Occupational Health and Safety Management Systems* (ANSI Z10), 2005
- U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual (EM-385-1-1)
- USACE, Safety and Occupational Health Requirements for Hazardous, Toxic, and Radioactive Waste Activities, Regulation No. 385-1-92, July 1, 2003;
- ANSI Z41 Protective Footwear
- ANSI Z89.1 Industrial Head Protection
- ANSI Z88.2 Respiratory Protection

- ANSI Z87.1 Eye and Face Protection
- ANSI Z358.1 Emergency Eyewash and Shower Equipment
- 29 CFR 1904 Recording and Reporting Occupational Injuries and Illnesses
- 29 CFR 1910 Occupational Safety and Health Standards
- American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs®) and Biological Exposure Indices, 2004
- AECOM Corporate Health and Safety Plan (this document will be on-site and available to site personnel during the project)
- Department of Defense 6055.9-Standard, Ammunition and Explosive Safety Standard

The requirements in this HASP also conform to AECOM's Corporate SH&E Program requirements as specified in the U.S. SH&E Manual, a copy of which will be maintained on-site at all times.

2.0 SITE INFORMATION AND SCOPE OF WORK

AECOM will conduct environmental services at LHAAP in Karnack, Texas. Work will be performed in accordance with the applicable Statement of Work (SOW) and associated Work Plans developed for the site. Deviations from the listed SOW will require that a Safety Professional review and changes made to this HASP, to ensure adequate protection of personnel and other property.

The following is a summary of relevant data concerning LHAAP, and the work procedures to be performed. The Work Plan prepared by AECOM as a companion document to this HASP provides significantly greater details concerning both site history and planned work operations.

2.1 SITE INFORMATION

This section provides a general description and historical information associated with the site.

2.1.1 General Description

LHAAP is located in Karnack, Texas.

2.1.2 Site Background/History

LHAAP is located in central east Texas in the northeast corner of Harrison County, approximately 14 miles northeast of Marshall, Texas, and approximately 40 miles west of Shreveport, Louisiana. The closed installation currently occupies 1,400 or its original 8,416 acres between State Highway 43 and the western shore of Caddo Lake. The area surrounding LHAAP is primarily rural and consists of forest lands; the small towns of Karnack and Uncertain, Texas; Caddo Lake; and Caddo Lake State Park. LHAAP was established in October 1942 with the primary mission of producing 2,4,6-trinitrotoluene (TNT) flake. Monsanto Chemical Company was the first contract operator of the plant. Production of 2,4,6-TNT continued through World War II until August 1945, when the plant went on standby status until February 1952. From 1952 until 1956, Universal Match Corporation was the contracting operator, producing such pyrotechnic ammunition as photoflash bombs, simulators, hand signals, and tracers for 40 millimeter (mm) ammunition. Thiokol assumed this responsibility, along with rocket motor production, with the departure of Universal Match Corporation in 1956. Production of rocket motors continued to be the primary mission of LHAAP until 1965, when the production of pyrotechnic and illuminating ammunition was reestablished.

Prior to 1994, operations consisted of compounding pyrotechnic and propellant mixtures, load, assemble, and pack activities, accommodating receipt and shipment of containerized cargo, and maintenance and/or layaway of standby facilities and equipment as they apply to mobilization planning. The installation was also responsible for static firing and elimination of Pershing I and II rocket motors in compliance with the Intermediate-Range Nuclear Force Treaty in effect between the U.S. and the former Union of Soviet Socialist Republics.

Currently there is a groundwater treatment plant operating on the site as an interim remedial action specified in the Record of Decision. The current contract for operations at this groundwater treatment plant will end on February 28, 2012. Future operations, if required, will be the responsibility of the Contractor.

LONGHORN ARMY AMMUNITION PLANT

As previously noted, LHAAP became inactive and excess to the U.S. Department of the Army's (U.S. Army's) needs in July 1997. A Memorandum of Agreement between the U.S. Army and U.S. Fish and Wildlife Service (USFWS) providing a framework for property transfers was signed in April 2004. Since May 2004, approximately 7,000 acres have been transferred to USFWS. The USFWS manages these acres as the Caddo Lake National Wildlife Refuge within the perimeter fence of the former installation. Although the perimeter fence and gates remain functional, guards are no longer posted since the U.S. Army's security contract expired on March 14, 2007. All environmental sites within LHAAP are currently on U.S. Army property, although future transfers to the USFWS are planned.

2.1.3 Previous Investigation

In recent years, Shaw Inc. has maintained the groundwater monitoring wells and the operations and maintenance of LHAAP.

2.2 SCOPE OF WORK

AECOM will provide all plant supervision, labor, materials and equipment necessary to meet the performance objectives and standards, to include: Remedy in Place, Remedial Action (Operations) (RA[O]), Response Complete, and Long-Term Monitoring (LTM).. Remedy in Place will be attained when remedial action has been constructed and implemented and is operating as planned in the remedial design subject to any requirement for RA(O). Response Complete will be attained upon the finalization of appropriate written documentation certifying that site remediation has met identified response objectives and no further action is necessary, subject to any requirement for LTM. The Contractor should note that when RA(O), LTM and/or a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) 121(c) review is necessary as a result of the Contractor's remediation activities at a site, the Contractor shall be responsible for the following:

- Performing the required RA(O) and/or LTM at that site for the duration of the contract.
- Conducting any CERCLA 121(c) reviews required at that site for the duration of the contract.
- CERCLA 121(c) reviews conducted during the duration of the contract constitute a Government Inspection of Services. The Contractor will warranty correction of any problems and/or deficiencies noted within CERCLA 121(c) reviews or any Contractor furnished service or submittal. Any service or submittal performed that does not meet contract requirements shall be corrected or re-performed by the Contractor at no additional cost to the Government. Corrective action must be certified and approved by the Contracting Officer's Representative. If the Contractor performs any task unsatisfactorily and all defects or deficiencies are not corrected, the Government reserves the right to terminate the contract for default. In addition, the Government reserves its rights under Federal Acquisition Regulation clause 52.246-4, Inspection of Services – Fixed Price, for further remedies concerning a Contractor's failure to perform in conformance with contract requirements. If the Contractor is conducting RA(O) or LTM, or completing a CERCLA 121(c) review, for a remedy that they did not implement or modify (i.e., an on-going pump and treat system inherited as part of this Performance Based Contract scope), correction of substantive remedy deficiencies noted during RA(O), LTM or within a CERCLA 121(c) review which may require modification of that remedy are considered outside the scope of this contract effort.

The list of work tasks that follow are inherently hazardous activities that have been analyzed to identify controls that will protect the safety and health of all personnel working at and entering the project site. Field activities that require hazard analysis include:

- Mobilization & Site Preparation
- Surveying
- Direct-Push Activities
- Monitoring Well Installation/Development/Abandonment
- Groundwater/Soil Sampling
- Surface Water/Sediment Sampling
- Excavation of Soil and Backfill
- Boat Mobilization/Launching
- On-Water Boat Operations
- In Situ Bioremediation/In Situ Chemical Oxidation
- Mowing

- Electrical hazards
- Hand and Power Tool Usage
- All Terrain Vehicles and Utility Vehicle Usage
- Motor Vehicle Operation
- Machinery and Mechanized Equipment
- Manual Lifting

2.2.1 Additional Work Operations

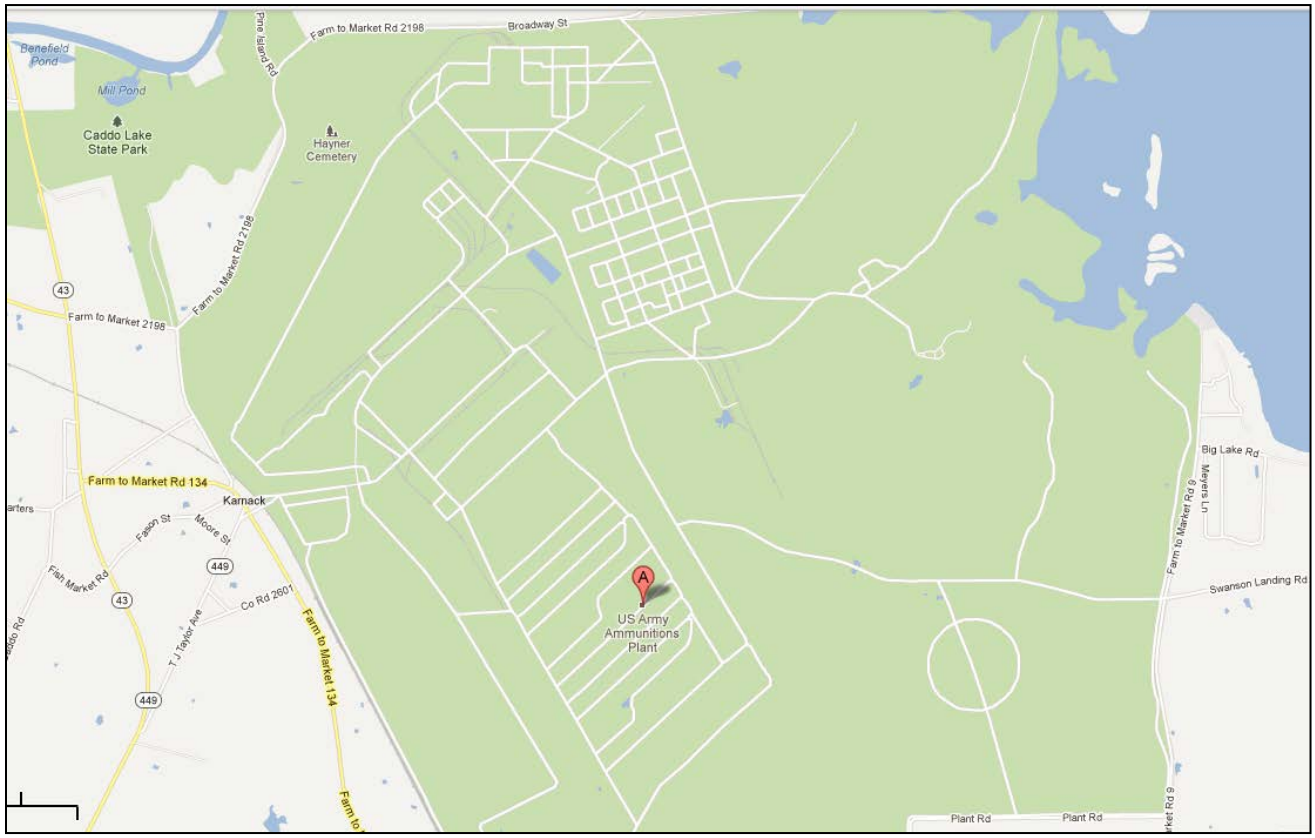
The following additional tasks will also be performed as necessary in support of planned site activities:

Mobilization/Demobilization: Mobilization and demobilization represent limited pre and post-task activities. These activities include driving to and from the site and general housekeeping.

Equipment Decontamination: AECOM and subcontractor personnel will perform decontamination of equipment used to perform work within controlled work areas and in accordance with USEPA protocols.

Investigative-Derived Waste (IDW) Management: All IDW will be managed in coordination with LHAAP. IDW will be collected and categorized as non-hazardous or hazardous in stock piles or in 55-gallon drums. Potentially hazardous IDW (purge water, and decontamination fluids, and soil cuttings [if any]) will be tested and disposed of within 90 calendar days of completing the field activities. Potentially hazardous IDW waste will be staged onsite prior to being delivered to a permitted off-site facility for processing. Non-hazardous IDW (normal trash) will be disposed of in a timely fashion during fieldwork.

Figure 2-1: Site Layout



3.0 PROJECT HEALTH AND SAFETY ORGANIZATION

3.1 WORK ORDER PROJECT MANAGER: DAVID WACKER

The PM has overall management authority and responsibility for all site operations, including safety. The specific safety responsibilities for the PM are listed in Section 4.5.2 of S3NA-209-PR Project Hazard Assessment and Planning[1]. The PM, with support from the Client Service Manager, will provide the Site Supervisor with work plans, staff, and budgetary resources, which are appropriate to meet the safety needs of the project operations.

3.2 SAFETY PROFESSIONAL: NASH DOYLE

The Safety Professional (SP) is the member of the AECOM SH&E Department assigned to oversee health and safety requirements for the project and provide any needed technical support. The SP will be the first point-of-contact for all of the project's health and safety matters. Duties include the following:

- Approving this HASP and any required changes
- Approving the designated Site Safety and Health Officer (SSHO)
- Reviewing all personal exposure monitoring results
- Investigating any reported unsafe acts or conditions

3.3 SITE SUPERVISOR: SCOTT BEESINGER

The Site Supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans. The PM may act as the Site Supervisor while on-site.

3.3.1 Responsibilities

The Site Supervisor is responsible to:

- Discuss deviations from the work plan with the SSHO and PM
- Discuss safety issues with the PM, SSHO, and field personnel
- Assist the SSHO with the development and implementation of corrective actions for site safety deficiencies
- Assist the SSHO with the implementation of this HASP and ensuring compliance
- Assist the SSHO with inspections of the site for compliance with this HASP and applicable SOPs

3.3.2 Authority

The Site Supervisor has authority to:

- Verify that all operations are in compliance with the requirements of this HASP, and halt any activity that poses a potential hazard to personnel, property, or the environment
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the SSHO, the Safety Professional, and the PM

3.3.3 Qualifications

In addition to being Hazardous Waste Operations and Emergency Response (HAZWOPER)-qualified (see Section 4.1), the Site Supervisor is required to have completed the 8-hour HAZWOPER Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4).

[1] Additional responsibilities as cited in the BNSF Programmatic SH&E Management Plan.

3.4 SITE SAFETY OFFICER: SCOTT BEESINGER

3.4.1 Responsibilities

The SSHO is responsible to:

- Update the site-specific HASP to reflect changes in site conditions or the scope of work. HASP updates must be reviewed and approved by the Safety Professional
- Be aware of changes in AECOM Safety Policy
- Monitor the lost time incidence rate for this project and work toward improving it
- Inspect the site for compliance with this HASP and the SOPs using the appropriate audit inspection checklist provided by an AECOM Safety Professional
- Work with the Site Supervisor and PM to develop and implement corrective action plans to correct deficiencies discovered during site inspections; Deficiencies will be discussed with project management to determine appropriate corrective action(s)
- Contact the Safety Professional for technical advice regarding safety issues
- Provide a means for employees to communicate safety issues to management in a discreet manner (i.e., suggestion box, etc.)
- Determine emergency evacuation routes, establish and post local emergency telephone numbers, and arranging emergency transportation
- Ensure that all site personnel and visitors have received the proper training and medical clearance prior to entering the site
- Establish any necessary controlled work areas (as designated in this HASP or other safety documentation)
- Present tailgate safety meetings and maintain attendance logs and records
- Discuss potential health and safety hazards with the Site Supervisor, the Safety Professional, and the PM
- Select an alternate SSHO by name and inform him/her of their duties, in the event that the SSHO must leave or is absent from the site

3.4.2 Authority

The SSHO has authority to:

- Verify that all operations are in compliance with the requirements of this HASP
- Issue a “Stop Work Order” under the conditions set forth in Section 4.9 of this HASP
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the Safety Professional and the PM

3.4.3 Qualifications

In addition to being HAZWOPER-qualified (see Section 4.1), the SSHO is required to have completed the 8-hour HAZWOPER Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4).

3.5 EMPLOYEES

3.5.1 Employee Responsibilities

Responsibilities of employees associated with this project include, but are not limited to:

- Understanding and abiding by the policies and procedures specified in the HASP and other applicable safety policies, and clarifying those areas where understanding is incomplete
- Providing feedback to health and safety management relating to omissions and modifications in the HASP or other safety policies

- Notifying the SSHO, in writing, of unsafe conditions and acts

3.5.2 Employee Authority

The health and safety authority of each employee assigned to the site includes the following:

- The right to refuse to work and/or stop work authority when the employee feels that the work is unsafe (including subcontractors or team contractors), or where specified safety precautions are not adequate or fully understood
- The right to refuse to work on any site or operation where the safety procedures specified in this HASP or other safety policies are not being followed
- The right to contact the SSHO or the Safety Professional at any time to discuss potential concerns

3.6 SUBCONTRACTORS

The requirements for subcontractor selection and subcontractor safety responsibilities are outlined in S3NA-213-PR, Subcontractors. Each AECOM subcontractor is responsible for assigning specific work tasks to their employees. Each subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required personal protective equipment (PPE).

AECOM considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with the regulatory requirements that pertain to those services. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures, in order to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to AECOM for review prior to the start of onsite activities, if required.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the AECOM PM or the Site Supervisor prior to beginning work operations. The Site Supervisor or authorized representative has the authority to halt any subcontractor operations, and to remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

3.7 VISITORS

Authorized visitors (e.g., client representatives, regulators, AECOM management staff, etc.) requiring entry to any work location on the site at the request of AECOM will be briefed by the PM on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer's health and safety policies. In addition, this HASP specifies the minimum acceptable qualifications, training and PPE, which are required for entry to any controlled work area. Visitors must comply with these requirements at all times.

Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

4.0 SAFETY PROGRAMS

4.1 HAZWOPER QUALIFICATIONS

Personnel performing work at the job site must be qualified as HAZWOPER workers (unless otherwise noted in specific activity hazard analysis (AHA) or by the SSHO), and must meet the medical monitoring and training requirements specified in the following safety procedures:

- S3NA-003-PR SH&E Training
- S3NA-210-PR Project Safety Meetings
- S3NA-507-PR Hazard Materials Communication /Workplace Hazardous Materials Information System(WHMIS)
- S3NA-509-PR Hazardous Waste Operations and Emergency Response

Personnel must have successfully completed training meeting the provisions established in 29 CFR 1910.120 (e)(2) and (e)(3) (40-hour initial training). As appropriate, personnel must also have completed annual refresher training in accordance with 29 CFR 1910.120 (e)(8); each person's most recent training course must have been completed within the previous 365 days. Personnel must also have completed a physical exam in accordance with the requirements of 29 CFR 1910.120 (f), where the medical evaluation includes a judgment of the employee's ability to use respiratory protective equipment and to participate in hazardous waste site activities. These requirements are further discussed in S3NA-509-PR Hazardous Waste Operations and Emergency Response.

If site monitoring procedures indicate that a possible exposure has occurred above the OSHA permissible exposure limit (PEL), employees may be required to receive supplemental medical testing to document symptoms specific to the particular materials present.

4.2 SITE-SPECIFIC SAFETY TRAINING

All personnel performing field activities at the site will be trained in accordance with S3NA-003-PR, SH&E Training. For this project, training will include the requirements specified in the following:

1. S3NA-210-PR, Project Safety Meetings
2. S3NA-507-PR, Hazardous Materials Communication - WHMIS
3. S3NA-509-PR, Hazardous Waste HAZWOPER Activities
4. S3NA-519-PR, Respiratory Protection Program

In addition to the general health and safety training programs, personnel will be:

- Instructed on the contents of applicable portions of this HASP and any supplemental health and safety information developed for the tasks to be performed
- Workers will be instructed on the proper ultraviolet (UV) radiation protection measures per SH&E S3NA-517-PR Radiation, Non-Ionizing
- Informed about the potential routes of exposure, protective clothing, precautionary measures, and symptoms or signs of chemical exposure and heat stress
- Made aware of task-specific physical hazards and other hazards that may be encountered during site work
- Made aware of fire prevention measures, fire extinguishing methods, and evacuation procedures

The site-specific training will be performed prior to the worker performing the subject task or handling the impacted materials and on an as-needed basis thereafter. Training will be conducted by the SSHO (or his/her designee) and will be documented on the form attached to SH&E SOP S3NA-210-PR Project Safety Meetings.

4.2.1 Competent-Person Training Requirements

In order to complete the planned scope of work, an OSHA-designated competent person must be onsite to perform the required daily inspections of equipment and/or operations. The competent person may be an AECOM or subcontractor employee.

4.3 HAZARD COMMUNICATION

Section 5.2 provides information concerning the materials that may be encountered as environmental contaminants during the work activities. In addition, any organization wishing to bring any hazardous material onto any AECOM-controlled work site must first provide a copy of the item's Safety Data Sheet (SDS) to the SSHO for approval and filing (the SSHO will maintain copies of all SDSs on-site). SDSs may not be available for locally-obtained products, in which case some alternate form of product hazard documentation will be acceptable. In accordance with the requirements of S3NA-507-PR Hazard Materials Communication / WHMIS, all personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all SDSs.

4.3.1 Container Labeling

AECOM personnel will ensure that all drums and containers are labeled according to contents. These drums and containers will include those from manufacturers and those produced on-site by operations. All incoming and outgoing labels shall be checked for identity, hazard warning, and name and address of responsible party. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.).

4.3.2 Material Safety Data Sheets

Attachment B provides copies of SDSs for those items planned to be brought on-site at the time this HASP is prepared. This information will be updated as required during site operations.

4.3.3 Employee Information and Training

Training employees on chemical hazards is accomplished through an ongoing corporate training program. Additionally, chemical hazards are communicated to employees through daily safety meetings held at AECOM field projects and by an initial site orientation program.

At a minimum, AECOM and subcontractor employees will be instructed about the following:

- Chemicals and their hazards in the work area
- How to prevent exposure to these hazardous chemicals
- What the company has done to prevent workers' exposure to these chemicals
- Procedures to follow if they are exposed to these chemicals
- How to read and interpret labels and SDSs for hazardous substances found on AECOM sites
- Emergency spill procedures
- Proper storage and labeling

Before a new chemical is introduced on-site, each AECOM and related subcontractor employee will be given information in the same manner as during the initial site orientation program. The SSHO will be responsible for seeing that the SDS for the new chemical is available for review by on-site personnel. The information pertinent to the chemical hazards will be communicated to project personnel.

Morning safety meetings will be held and the hazardous materials used on-site will be discussed. Attendance is mandatory for all on-site employees.

4.4 CONFINED SPACE ENTRY

The SSHO/Site Supervisor shall identify all potential confined spaces in accordance with SH&E SOP S3NA-301-PR, Confined Spaces. In addition, the SSHO/Site Supervisor will inform all employees of the location of

confined spaces. Confined space entry procedures and training requirements are listed in SH&E 301. Currently Confined Spaces are not anticipated to be encountered during this project.

4.5 HAZARDOUS, SOLID, OR MUNICIPAL WASTE

If hazardous, solid, and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable Federal, State, and/or local regulations.

4.6 GENERAL SAFETY RULES

All site personnel shall adhere to S3NA-001-PR Safe Work Standards and Rules, during site operations. In addition, the housekeeping, sanitation, and personal hygiene requirements in S3NA-307-PR Housekeeping, Worksite will be observed. Specific excerpts from S3NA-307 are listed below.

4.6.1 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials.

4.6.2 Smoking, Eating, or Drinking

Smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will first wash hands and face immediately after leaving controlled work areas (and always prior to eating or drinking). Consumption of alcoholic beverages is prohibited at any AECOM site.

4.6.3 Personal Hygiene

The following personal hygiene requirements will be observed:

Water Supply: A water supply meeting the following requirements will be utilized:

> *Potable Water* - An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual-use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.
>
> *Non-Potable Water* - Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes. All containers of non-potable water will be marked with a label stating:
>
> ***Non-Potable Water***
> ***Not Intended for Drinking Water Consumption***

Toilet Facilities: A minimum of one toilet will be provided for every 20 personnel on-site, with separate toilets maintained for each sex except where there are less than five total personnel on-site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.

Washing Facilities: Employees will be provided washing facilities (e.g., buckets with water and Alconox) at each work location. The use of water and hand soap (or similar substance) will be required by all employees following exit from the Exclusion Zone (EZ), prior to breaks, and at the end of daily work activities.

4.6.4 Buddy System

All field personnel will use the buddy system when working within any controlled work area. Personnel belonging to another organization on-site can serve as "buddies" for AECOM personnel. Under no circumstances will any employee be present alone in a controlled work area. For areas not in controlled work areas, the procedures outlined in S3NA-314-PR Working Alone & Remote Travel will be followed at all times.

4.6.5 Heat and Cold Stress

Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress. For additional requirements, refer to SH&E SOP S3NA-511-PR, Heat Stress and SH&E SOP S3NA-505-PR, Cold Stress Prevention.

Severe weather can occur with little warning. The employee must be aware of the potentials for lightning, flash flooding and high wind events. AECOM Work Instruction S3NA 203-WI1, Emergency Response to Specific Hazards provides additional guidance.

Be Prepared, Know What is Coming your Way

- Listen to the radio for severe weather alerts.
- Check the Storm Prediction Center's web page for alerts and warnings.

http://www.spc.noaa.gov/products/wwa/

- Pay attention to the weather in your area, up wind of your location, and in the watershed upstream from your location.
- When in the field, be aware of the route you must take to get to shelter.

When working in low areas, be aware of the potential for flash flooding and the route to higher ground.

4.6.5.1 Heat Stress

Types of Heat Stress

Heat related problems include **heat rash, fainting, heat cramps, heat exhaustion and heat stroke**. **Heat rash** can occur when sweat isn't allowed to evaporate; leaving the skin wet most of the time and making it subject to irritation. **Fainting** may occur when blood pools to lower parts of the body and as a result, does not return to the heart to be pumped to the brain. Heat related fainting often occurs during activities that require standing erect and immobile in the heat for long periods of time. **Heat cramps** are painful spasms of the muscles due to excessive salt loss associated with profuse sweating.

Heat exhaustion typically results from the loss of large amounts of fluid and excessive loss of salt from profuse sweating. The skin will be clammy and moist and the affected individual may exhibit giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. The skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. **EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.** A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling.

Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat-Related Health Problems:

decline in task performance	excessive fatigue	coordination reduced
vigilance	decline in alertness	muscle cramps
unsteady walk	dizziness	

Susceptibility to Heat Stress Increases due to:

lack of physical fitness	obesity	lack of acclimatization
drug or alcohol use	increased age	sunburn
dehydration	infection	

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in PPE need to gradually adjust to the heat.

The Effect of PPE

Sweating normally cools the body as moisture is removed from the skin by evaporation. However, the wearing of certain PPE, particularly chemical protective coveralls (e.g., Tyvek), reduces the body's ability to evaporate sweat and thereby regulate heat buildup. The body's efforts to maintain an acceptable temperature can therefore become significantly impaired by the wearing of PPE.

Measures to Avoid Heat Stress:

The following guidelines should be adhered to when working in hot environments:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom)
- Identify a shaded, cool rest area
- Rotate personnel, alternative job functions
- Water intake should exceed sweat produced. Most workers exposed to hot conditions drink an insufficient amount of fluids than needed because of a lack of thirst. **DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK**. Consume enough liquid to force urination every two hours. In humid climates ice water or ice should be consumed to help maintain normal body temperature since evaporation does not provide an efficient mechanism for heat removal
- Eat light meals before and during work shifts. Avoid highly salted foods
- Drink sports drinks such as Gatorade® diluted 1:1 with water
- Save most strenuous tasks for non-peak heat hours such as the early morning or at night
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration

The implementation and enforcement of the above mentioned measures will be the joint responsibility of the PM and SSHO. Potable water and fruit juices should be made available each day for the field team.

Table 4-1: Temperature Adjustment Factors

Time of Day	
Before daily temperature peak[2]	+2°F
10 am – 2 pm (peak sunshine)	+2°F
Sunshine	
No clouds	+1°F
Partly Cloudy (3/8 – 5/8 cloud cover)	-3°F
Mostly Cloudy (5/8 – 7/8 cloud cover)	-5°F
Cloudy (>7/8 cloud cover)	-7°F
Indoor or nighttime work	-7°F
Wind (*ignore if indoors or wearing CPC*)	
Gusts greater than 5 miles per hour at least once per minute	-1°F
Gusts greater than 10 miles per hour at least once per minute	-2°F
Sustained greater than 5 miles per hour	-3°F
Sustained greater than 10 miles per hour	-5°F
Humidity (*ignore if wearing CPC*)	
Relative Humidity greater than 90%	+5°F

[2] This adjustment accounts for temperature rise during the day. If the temperature has already reached its daytime peak it can be ignored.

Relative humidity greater than 80%	+2°F
Relative Humidity less than 50%	-4°F
Chemical Protective Clothing (CPC)	
Modified Level D PPE (coveralls, no respirator)	+5°F
Level C PPE (coveralls w/o hood, full-face respirator)	+8°F
Level C PPE (coveralls with hood, full-face respirator)	+10°F
Level B PPE with airline system	+9°F
Level B PPE with self contained breathing apparatus	+9°F and right one column[3]
Level A PPE	+14°F and right one column[2]
Other	Specified in the HASP
Miscellaneous	
Unacclimated work force	+5°F
Partially acclimated work force	+2°F
Working in shade	-3°F
Breaks taken in air conditioned space	-3°F

Table 4-2: Work Rest Schedule

Work-Rest Regimen	Adjusted Temperature (°F)			
	Light Work	Moderate Work	Heavy Work	Very Heavy Work
No specified requirements	< 80	< 75	< 70	< 65
15 minute break every 90 minutes of work	80 – 90	75 - 85	70 - 80	65 – 75
15 minute break every 60 minutes of work	>90 – 100	> 85 - 95	>80 - 85	>75 - 80
15 minute break every 45 minutes of work	>100 – 110	>95 - 100	>85 - 90	>80 - 85
15 minute break every 30 minutes of work	>110 - 115	>100 - 105	>90 - 95	>85 - 90
15 minute break every 15 minutes of work	>115 - 120	>105 - 110	>95 -100	>90 - 95
Stop Work	**>120**	**>110**	**>100**	**>95**

Note: Time spent performing decontamination or donning/doffing CPC should not be included in calculating work or break time lengths.

Heat Stress Monitoring Techniques

Site personnel should regularly monitor their heart rate as an indicator of heat strain by the following method:

Radial pulse rates may be checked by using fore-and middle fingers and applying light pressure top the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beats/minute, the next work cycle will be shortened by one-third and the rest period will be kept the same. If, after the next rest period, the pulse rate still exceeds 110 beats/minute, the work cycle will be shortened again by one-third.

[3] Locate the proper column based on work rate, then move one column to the right (next higher work rate) before locating the corresponding adjusted temperature.

4.6.5.2 Responding to Heat-Related Illness

The guidance below will be used in identifying and treating heat-related illness.

Table 4-3: Identification and Treatment of Heat-Related Illness

Type of Heat-Related Illness	Description	First Aid
Mild Heat Strain	The mildest form of heat-related illness. Victims exhibit irritability, lethargy, and significant sweating. The victim may complain of headache or nausea. This is the initial stage of overheating, and prompt action at this point may prevent more severe heat-related illness from occurring.	• Provide the victim with a work break during which he/she may relax, remove any excess protective clothing, and drink cool fluids. • If an air-conditioned spot is available, this is an ideal break location. • Once the victim shows improvement, he/she may resume working; however, the work pace should be moderated to prevent recurrence of the symptoms.
Heat Exhaustion	Usually begins with muscular weakness and cramping, dizziness, staggering gait, and nausea. The victim will have pale, clammy moist skin and may perspire profusely. The pulse is weak and fast and the victim may faint unless they lie down. The bowels may move involuntarily.	• Immediately remove the victim from the work area to a shady or cool area with good air circulation (*avoid drafts or sudden chilling*). • Remove all protective outerwear. • Call a physician. • Treat the victim for shock. (*Make the victim lie down, raise his or her feet 6–12 inches, and keep him/her cool by loosening all clothing*). • If the victim is conscious, it may be helpful to give him/ her sips of water. • Transport victim to a medical facility as soon as possible.
Heat Stroke	The most serious of heat illness, heat stroke represents the collapse of the body's cooling mechanisms. As a result, body temperature may rise to 104 degrees Fahrenheit (^{o}F) or higher. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, nausea can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly and death is imminent if exposure continues. Heat stroke can occur suddenly.	• Immediately evacuate the victim to a cool/shady area. • Remove all protective outerwear and as much personal clothing as decency permits. • Lay the victim on his/her back w/the feet slightly elevated. • Apply cold wet towels or ice bags to the head, armpits, and thighs. • Sponge off the bare skin with cool water. • The main objective is to cool without chilling the victim. • Give no stimulants or hot drinks. • Since heat stroke is a severe medical condition requiring professional medical attention, emergency medical help should be summoned immediately to provide onsite treatment of the victim and proper transport to a medical facility.

4.6.5.3 Cold Stress

Type of Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity and high winds, contact with wetness and inadequate clothing.

The likelihood of developing frostbite occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30 ^{o}F. When fluids around the cells of the body tissue freeze, skin turns white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly.

Symptoms of Cold Stress

The first symptom of frostbite is usually an uncomfortable sensation of coldness, followed by numbness. There might be a tingling, stinging or aching feeling in the affected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of hypothermia, a condition of abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and can become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

Maximum severe shivering develops when the body temperature has fallen to 95 ^{o}F. Productive physical and mental work is limited when severe shivering occurs. Shivering is a serious sign of danger. Immediately remove any person who is shivering from the cold.

Methods to Prevent Cold Stress

When the ambient temperature, or a wind chill equivalent, falls to below 40 ^{o}F (ACGIH recommendation), site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hard hat helmet liners and insulated hand protection. Wool mittens are more efficient insulators than gloves. Keeping the head covered is very important, since 40% of body heat can be lost when the head is exposed. If it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn.

Persons should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should ideally be wind and waterproof. Clothing made of thin cotton fabric or synthetic fabrics such as polypropylene is ideal since it helps to evaporate sweat. Polypropylene is best at wicking away moisture while still retaining its insulating properties. Loosely fitting clothing also aids in sweat evaporation. Denim is not a good protective fabric. It is loosely woven which allows moisture to penetrate. Socks with a high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton, polypropylene or similar types of synthetic material that wick away moisture. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

If wind conditions become severe, it might become necessary to shield the work area temporarily. The SSHO and the PM will determine if this type of action is necessary. Heated break trailers or a designated area that is heated should be available if work is performed continuously in the cold at temperatures, or equivalent wind chill temperatures, of 20 ^{o}F.

Dehydration occurs in the cold environment and can increase the susceptibility of the worker to cold injury due to significant change in blood flow to the extremities. Drink plenty of fluids, but limit the intake of caffeine.

The table below will be used for calculating cold weather breaks due to due to temperature and wind speed.

Table 4-4: Cold Weather Break Calculation

Sunny Sky Air Temperature		No Noticeable Wind		Wind 8 km/h (5 mph)		Wind 16 km/h (10 mph)		Wind 24 km/h (15 mph)		Wind 32 km/h (20 mph)	
°C below zero*	°F below zero*	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours	Max. work period	Number of breaks /4 hours
26 to 28	15 to 19	normal breaks	1	normal breaks	1	75 minutes	2	55 minutes	3	40 minutes	4
29 to 31	20 to 24	normal breaks	1	75 minutes	2	55 minutes	3	40 minutes	4	30 minutes	5
32 to 34	25 to 29	75 minutes	2	55 minutes	3	40 minutes	4	30 minutes	5	Non-emergency work should stop	
35 to 37	30 to 34	55 minutes	3	40 minutes	4	30 minutes	5	Non-emergency work should stop			
38 to 39	35 to 39	40 minutes	4	30 minutes	5	Non-emergency work should stop					
40 to 42	40 to 44	30 minutes	5	Non-emergency work should stop							
43 and below	45 and below	Non-emergency work should stop									

4.6.5.4 UV Radiation Protection

To protect against exposure to UV radiation, workers will observe the following requirements:

1. All workers will wear sunglass-type safety glasses at all times when working outdoors during daylight hours.
2. Workers will utilize a commercial sunblock with a minimum solar protection factor (SPF) of 15 or higher.
3. Wide-brim hard hats are recommended as they provide additional UV protection.

4.7 USE OF UTILITY KNIVES OR OTHER OPEN-BLADED CUTTING TOOLS

All utility knives with manually retracting blades (including "pocket knives" and other "collapsible, open-blade cutting tools") are no longer permitted on any AECOM jobsite, unless specifically authorized on a task-specific basis in this HASP and associated THA/ Job Safety Analysis (JSA). The only acceptable type of utility knife will be those with automatically retracting blades. Other "cutters" must be equipped with a completely enclosed and guarded blade. Additional recommendations regarding the use of cutting tools can be found in S3NA-305-PR Hand and Power Tools.

4.8 EQUIPMENT SAFETY CARDS

Equipment safety cards have been produced by the SH&E Department for review prior to operating portable mechanized equipment (e.g., chainsaws, chop saws, power washers, etc.). Equipment safety cards should be used as a point of reference prior to using the specified piece of equipment. The cards will be used in conjunction with the manufacturers operating instructions. Personnel must be adequately trained in the tools usage prior to operation, thus using the card as a reminder or THA/JSA for additional safe operation. The cards are not a substitute for training, which at a minimum, must consist of having an observed skill set indicating good working knowledge and equipment operation time. The applicable Equipment Safety Cards are included in Attachment C of this HASP.

4.9 STOP WORK AUTHORITY

All employees have the right and duty to stop work when conditions are unsafe and to assist in correcting these conditions as outlined in S3NA-002-PR Stop Work Authority for Unsafe Work. Whenever the SSHO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the supervisor be unable or unwilling to correct the unsafe conditions, the SSHO is authorized and required to stop work, which shall be immediately binding on all affected AECOM employees and subcontractors.

Upon issuing the stop work order, the SSHO shall implement corrective actions so that operations may be safely resumed. Resumption of safe operations is the primary objective; however, operations shall not resume until the Safety Professional has concurred that workplace conditions meet acceptable safety standards.

4.10 CLIENT SPECIFIC SAFETY REQUIREMENTS

All planned subsurface activities comply with the LHAAP guidelines for underground utility clearance prior to the performance of any AECOM or subcontractor-performed subsurface activities.

4.11 ENVIRONMENTAL COMPLIANCE AND MANAGEMENT

This project and the individual taskings will comply with all federal, state, provincial, and local environmental requirements as well as S3NA-204-PR, Environmental Compliance.

4.11.1 Air Emissions

Air quality is not expected to be an issue as a result of the proposed work at LHAAP. The generation of dust will be minimized during all activities to prevent subsequent degradation of air quality. Dust control measures such as wetting, geotextile, or other means will be employed where the potential for dust generation occurs.

4.11.2 Hazardous Waste Management

All hazardous waste management, characterization, storage, treatment, transport, and disposal will be completed in accordance with the Texas Commission on Environmental Quality (TCEQ) which has adopted the federal hazardous waste regulations (40 CFR Parts 260-279). IDW will be stored onsite until the soil, purge water, and decon water can be characterized from the analytical data. No potential hazardous waste will be transported offsite without proper characterization data and evaluation. All transport & disposal activities will be coordinated through a contractor. AECOM will not sign any hazardous waste manifests without the approval of AECOM's Legal Department.

4.11.3 Stormwater Pollution Prevention

While the size of the activities will not dictate the need for a Stormwater Pollution Prevention Plan, AECOM will take all precautions necessary to prevent the discharge of waters from the site in order to minimize stormwater pollution.

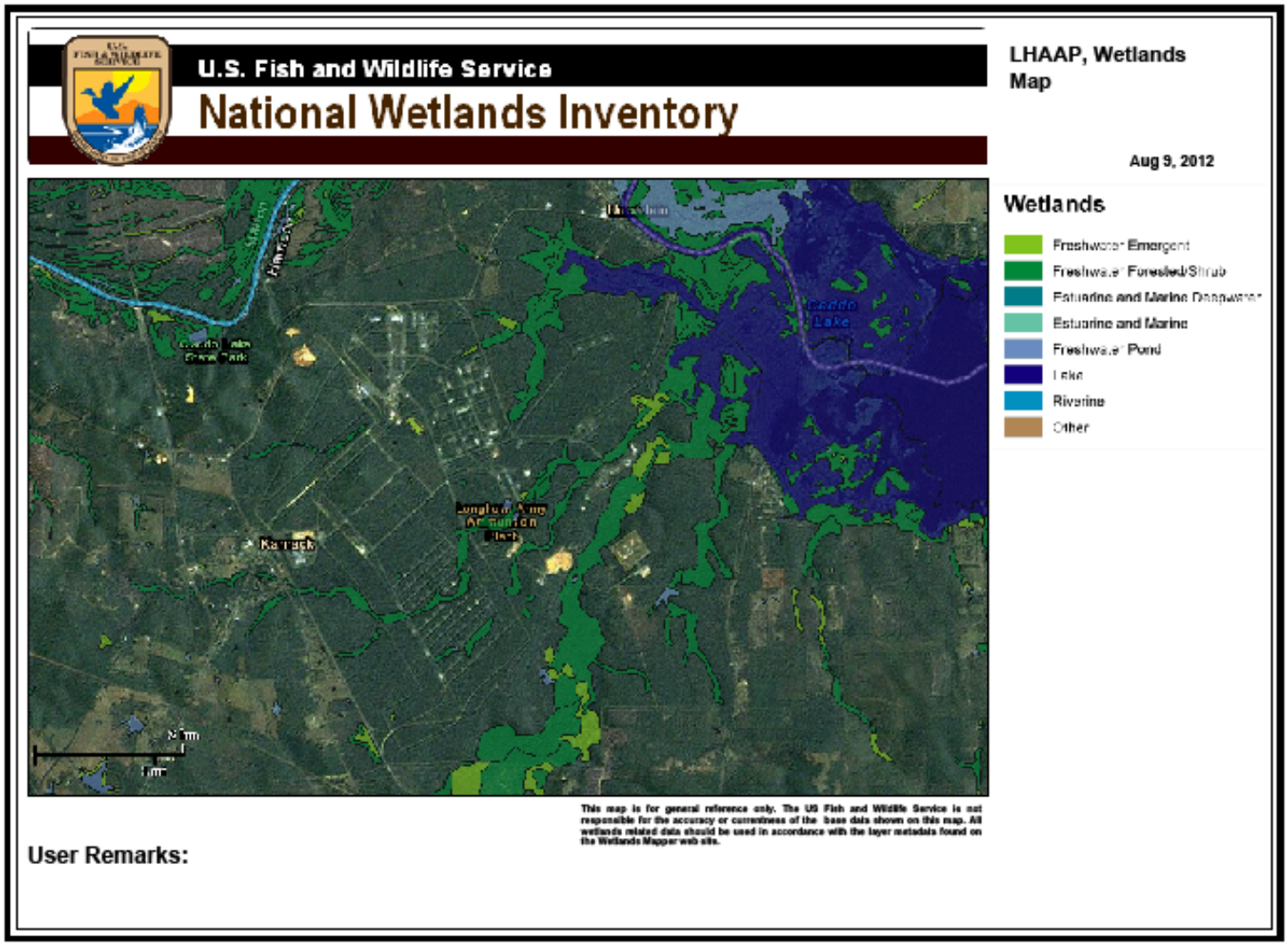
4.11.4 Wetlands Protection

An evaluation using the USFWS's *Wetlands Online Mapper* tool, Figure 4-1, indicated there were wetlands in the vicinity of the proposed work at LHAAP.

4.11.5 Critical Habitat Protection

After reviewing the U.S Fish and Wildlife Service's Critical Habitat Mapper for the Karnack, Texas area, no critical habitats were identified. This data will be verified with the LHAAP site environmental team and if critical habitat(s) are identified, then the appropriate protective measures will be taken to minimize the impact of AECOM operations on any given critical habitat.

Figure 4-1: LHAAP Wetlands Map



5.0 HAZARD ASSESSMENT

5.1 HAZARD ANALYSIS

AHA's are a techniques used to identify hazards and hazard controls associated with a specific job function. AHAs focus on the relationship between the workers, the task, the resources required to complete the task, and the work environment. These variables must be evaluated to identify the potential hazards associated with the task. Once identified, steps can be taken to eliminate, reduce, or control the hazards to an acceptable risk level. Guidelines for developing THAs/JSAs are located in S3NA-209-PR, Project Hazard Assessment and Planning.

Section 2.2 describes the work activities anticipated to be performed during this project. Individual THAs/JSAs for the tasks associated with this work can be found in Attachment A.

5.1.1 Unanticipated Work Activities/Conditions

Operations at the Site may require additional tasks not identified in Section 2.2 or addressed in Attachment A, THAs/JSAs. Before performing any task not covered in this HASP a THA/JSA must be prepared, and approved by the Safety Professional.

5.2 ENVIRONMENTAL CONTAMINANT EXPOSURE HAZARDS

The following is a discussion of the hazards presented to worker personnel during this project from on-site chemical and radiological hazards known or suspected to be present on-site. Hazards associated with chemical products brought to the site during work operations are addressed separately, under the Hazard Communication process described in Section 4.3.

Exposure symptoms and applicable first aid information for each suspected Site contaminant are located in the following subsections.

5.2.1 Volatile and Semi-Volatile Organic Compounds

Volatile organic compounds (VOCs) refer to a group of volatile compounds or mixtures that are relatively stable chemically and that exists in the liquid state at temperatures of approximately 32 to 82 °F.

(VOCs are typically organic solvents used for extracting, dissolving, or suspending materials such as fats, waxes, and resins that are not soluble in water. The removal of the solvent from a solution permits the recovery of the solute intact with its original properties. Solvents are used in paints, adhesives, glues coatings, and degreasing/ cleaning agents.

Semi-volatile organic compounds are less volatile chemicals that tend to persist in the environment.

Inhalation and percutaneous absorption are the primary routes of exposure. Organic compounds are metabolized or they accumulate in the lipid-rich tissues such as the liver, fat cells, or the nervous system.

Solvent inhalation by workers can cause effects ranging from an alcohol-like intoxication to narcosis and death from respiratory failure. Symptoms may include drowsiness, headache, dizziness, dyspepsia, and nausea.

5.2.2 Chlorinated Solvents

Chlorinated solvents are a large family of chemical compounds that contain chlorine, for example, carbon tetrachloride, trichloroethylene , or methylene chloride. They are used for a wide variety of commercial and industrial purposes, including degreasers, cleaning solutions, paint thinners, pesticides, resins, glues, and a host of other mixing and thinning solutions. Their chlorine-containing chemical structure helps them to efficiently dissolve organic materials like fats and greases and to serve as raw materials or intermediates in the production of other chemicals. Workers can be exposed to chlorinated solvents through the absorption of solvents, through inhalation and skin contact. Inhalation is the most common form of workplace exposure, because the solvents can readily evaporate. Skin contact is another important route of exposure in the workplace.

Exposures can lead to short-term or long-term health effects, depending on the manner by which they entered your body and the amount of exposure. Short-term side effects may include dizziness, fatigue, headaches, and/or

skin rashes. Long-term side effects may include chronic skin problems, and/or damage to the nervous system, kidneys, or liver. Some chlorinated solvents are also known to cause cancer, in both humans and animals.

5.2.3 Methylene Chloride

CAS 75-09-2; RTECS PA8050000; UN 1593

Methylene chloride, is a nonflammable, colorless liquid with a pleasant aromatic odor noticeable at 250 to 300 parts per million (ppm). This, however, should not be relied upon as an adequate warning of unsafe concentrations. The boiling point is 40 degrees Celsius (^{o}C) with a lower exposure limit (LEL) of 12% and upper exposure limit of 19%. Synonyms are dichloromethane, methylene dichloride and methylene bichloride.

Methylene chloride is used mainly as a low-temperature extractant of substances which are adversely affected by high temperature. It can be used as a solvent for oil, fats, waxes, bitumen, cellulose acetate, and esters. It is also used as a paint remover and as a degreaser.

The OSHA PEL is 25 ppm and the 1998 ACGIH TLV is 50 ppm (175 milligrams per cubic meter [mg/m^3]). NIOSH recommends exposure to be as low as reasonably achievable.

Routes of entry are via inhalation of vapors, percutaneous absorption of liquid, ingestion, skin and eye contact. Harmful effects and symptoms of short-term exposure consist of the following:

Inhalation - Levels of 300 to 700 ppm for 3 to 5 hours have caused slight loss of muscle control and coordination. Effects of higher concentrations include stupor, dizziness, chest pain, arm and leg pains, loss of feeling, loss of appetite, hot flashes and death.

Skin - May be irritating if confined on the skin by gloves or clothing. May be absorbed slowly through the skin to cause symptoms listed under inhalation.

Eyes - May cause pain, irritation and burns.

Ingestion - Accidental ingestion of paint removers containing dichloromethane as the main ingredient have reportedly caused headache, nausea, vomiting, visual disturbance, presence of blood in the urine, and unconsciousness.

Special Note - Methylene chloride is changed to carbon monoxide in the human body. This is a particularly hazardous condition for those who have a history of heart trouble or those who are also exposed to carbon monoxide. These persons should take extra precautions.

Harmful effects associated with long-term exposure are the same as above. Prolonged exposure can cause changes in blood, hallucinations and decreased response to visual and auditory stimulation. Some long-term exposures have also resulted in damage to the liver. Most of the effects will disappear after exposure stops.

Level C PPE (air-purifying respiratory protection) cannot be used since suppliers of respiratory protection do not typically approve their cartridges for methylene chloride application. Determination in air is via collection on charcoal adhering to NIOSH Method 1005.

5.2.4 Lead

CAS 7439-92-1; RTECS OF7525000

Inorganic lead, includes lead oxides, metallic lead, lead salts, and organic salts such as lead soaps, but excludes lead arsenate and organic lead compounds. Lead is a blue-grey metal which is very soft and malleable.

Metallic lead is used for lining tanks, piping, and other equipment where pliability and corrosion resistance are required such as in the chemical industry in handling corrosive gases and liquids used in the manufacture of sulfuric acid; in petroleum refining; and in halogenation, sulfonation, extraction, and condensation processes; and in the building industry.

It is also used as an ingredient in solder, a filler in the automobile industry, and a shielding material for x-rays and atomic radiation; in manufacture of tetraethyl lead and organic and inorganic lead compounds, pigments for paints and varnishes, storage batteries, flint glass, vitreous enameling, ceramics as a glaze, litharge rubber, plastics, and

electronic devices. Lead is utilized in metallurgy and may be added to bronze, brass, steel, and other alloys to improve their characteristics. It forms alloys with antimony, tin, copper, etc. It is also used in metalizing to provide protective coatings and as a heat treatment bath in wire drawing.

Exposures to lead dust may occur during mining, smelting, and refining, and to fume, during high temperature (above 500 ^{o}C) operations such as welding or spray coating of metals with molten lead. There are numerous applications for lead compounds, some of the more common being in the plates of electric batteries and accumulators, as compounding agents in rubber manufacture, as ingredients in paints, glazes, enamels, glass, pigments, and in the chemical industry.

In addition to these usual levels of exposure from environmental media, there exists miscellaneous sources which are hazardous. The level of exposure resulting from contact is highly variable. Certain adults may also be exposed to hazardous concentrations of lead in the workplace, notably in lead smelters and storage battery manufacturing plants. Again, the range of exposure is highly variable. Women in the workplace are more likely to experience adverse effects from lead exposure than men due to the fact that their hematopoietic system is more lead-sensitive than men's.

Lead is regulated under 29 CFR 1910.1025. The PEL for lead is 50 µg/m^3 (0.05 mg/m^3 with an action level of 30 µg/m^3 (0.03 mg/m^3. The NIOSH recommended exposure limit (REL) is less than 0.1 mg/m^3 and the ACGIH TLV is 0.05 mg/m^3. The immediately dangerous to life or health (IDLH) value is 100 mg/m^3.

Routes of entry are ingestion of dust, inhalation of dust or fume and skin and eye contact. The points of attack are the kidneys, blood, gingival tissue, gastrointestinal system, and central nervous system.

Lead is a cumulative poison. Increasing amounts can build up in the body eventually reaching a point where symptoms and disability occur. Lead dust carried home on contaminated clothing can result in exposure and symptoms in other family members. Standards only protect for inhalation exposure. Extra precautions should be taken if skin exposure also occurs. Harmful effects and symptoms of short-term exposure are as follows:

> *Inhalation* - The effects of exposure to fumes and dusts of inorganic lead may not develop quickly. Symptoms may include decreased physical fitness, fatigue, sleep disturbance, headache, aching bones and muscles, constipation, abdominal pains and decreased appetite. These effects are reported to be reversible if exposure ceases. Inhalation of large amounts of lead may lead to seizures, coma and death.
>
> *Skin* - May cause irritation.
>
> *Eyes* - May cause irritation.
>
> *Ingestion* - See effects listed for inhalation. Ingestion of large amounts of lead may lead to seizures, coma and death.

Long-term exposure involves the accumulation of lead in the body over a period of time. Therefore, long-term exposure to lower levels can result in a build-up of lead in the body and more severe symptoms. These may include anemia, pale skin, a blue line at the gum margin, decreased hand-grip strength, abdominal pain, severe constipation, nausea, vomiting, and paralysis of the wrist joint. Prolonged exposure may also result in kidney damage. If the nervous system is affected, usually due to very high exposures, the resulting effects include severe headache, convulsions, coma, delirium and death. In non-fatal cases, recovery is slow and not always complete. Alcohol ingestion and physical exertion may bring on symptoms. Continuous exposure can result in decreased fertility. Elevated lead exposure of either parent before pregnancy can increase the chances of miscarriage or birth defects. Exposure of the mother during pregnancy can cause birth defects.

Both the Mask Safety Association and North Safety approve level C PPE use up to 2.5 mg/m^3 (full face with high efficiency particulate air (HEPA) cartridge). Above this value, level B PPE must be used. Determination in air is via collection on a filter and analysis adhering to NIOSH Method 7082 or 7105.

5.2.5 Mercury

CAS 7439-97-6; RTECS 0V4550000; UN 2809

Mercury is a silvery, mobile, odorless liquid. It boils at 356 to 357 °C. A synonym is Quicksilver. Mercury is used as a liquid cathode in cells for the electrolytic production of caustic and chlorine. Mercury is also used in electrical apparatus (lamps, rectifiers and batteries) and in control instruments (switches, thermometers and barometers).

The notation "skin" applies indicating the possibility of cutaneous absorption for mercury vapor. The IDLH level is 10 mg/m^3. The PEL is 0.05 mg/m^3, REL is 0.1 mg/m^3, and the TLV is 0.025 mg/m^3.

Route of entry is through inhalation, skin absorption, eye and skin contact. Harmful effects and symptoms of short-term exposure are as follows:

Inhalation - Exposure to levels below 1 mg/m^3 has been shown to produce nonspecific symptoms such as shyness, insomnia, anxiety and loss of appetite. At higher levels (1 to 3 mg/m^3 for 2 to 5 hours) exposure may cause headache, salivation, metallic taste, chills, cough, fever, tremors, abdominal cramps, diarrhea, nausea, vomiting, tightness in the chest, difficult breathing, fatigue, lung irritation and possible lung tissue damage. Symptoms may begin several hours after exposure and may last a week. Large doses may result in flu-like symptoms, which, in severe cases, may result in death due to pneumonia.

Skin - Can be absorbed through the skin. May cause irritation. Prolonged contact with skin can result in symptoms listed above.

Eyes - Can cause eye irritation.

Ingestion - Generally does not produce ill effects.

Harmful effects and symptoms of long-term exposure - Mercury accumulates in the brain quickly during exposure but is released from the brain very slowly. This will result in a build-up in brain tissue over a long time. The liver and kidneys may also be damaged by mercury accumulation. It may cause headache, dizziness, restlessness, irritability, sleepiness, tremors, defective muscle control, increased salivation, loose teeth, irritation of the gums with a blue line between teeth and gums, loss of appetite, nausea, vomiting, diarrhea, liver damage, changes in urine, raised red areas and blisters of skin, impaired memory and possibly permanent brain damage.

Frequency of complaints and severity of symptoms increase with levels of exposure, most notably above 0.1 mg/m^3. However, many of these symptoms have been reported at levels below recommended limits due to the accumulation of mercury over long-term exposure.

Level C PPE with a mercury vapor/HEPA cartridge is permitted up to 10 mg/m^3. Determination in air is via adsorption on silvered Chromosorb P, thermal desorption, and analysis by flameless atomic absorption spectrometry. See NIOSH Method 6009.

5.2.6 Perchlorate

Perchlorate is both a naturally occurring and man-made chemical. Most of the perchlorate manufactured in the U.S. is used as the primary ingredient of solid rocket propellant. Wastes from the manufacture and improper disposal of perchlorate-containing chemicals are increasingly being discovered in soil and water. Perchlorate is associated with the disruption of thyroid function, which can potentially lead to thyroid tumor formation. The USEPA, federal, state, and water suppliers are already actively addressing perchlorate in drinking water and surface water.

Residual amounts of these chemicals may be present during soil excavation, well installation and groundwater sampling activities; however, potential for worker exposure to these substances is remote. Airborne dust and particulate at well installation sites will be closely controlled. Real-time air monitoring will be conducted during large remedial activities to monitor potential exposure and action levels established to initiate PPE upgrades. Workers will undergo initial personal monitoring to determine actual exposure levels, and confirm PPE levels.

The following general symptoms may indicate exposure to a hazardous chemical. Personnel will be removed from the work site and provided immediate medical attention if the following symptoms occur:

- Dizziness or stupor
- Nausea, headaches, or cramps
- Irritation of the eyes, nose, or throat
- Euphoria
- Chest pains and coughing
- Rashes or burns

5.2.7 Hydrochloric Acid

Hydrochloric acid has many uses. It is used in the production of chlorides, fertilizers, and dyes, in electroplating, and in the photographic, textile, and rubber industries. Hydrochloric acid is corrosive to the eyes, skin, and mucous membranes. Acute (short-term) inhalation exposure may cause eye, nose, and respiratory tract irritation and inflammation and pulmonary edema in humans. Acute oral exposure may cause corrosion of the mucous membranes, esophagus, and stomach and dermal contact may produce severe burns, ulceration, and scarring in humans. Chronic (long-term) occupational exposure to hydrochloric acid has been reported to cause gastritis, chronic bronchitis, dermatitis, and photosensitization in workers. Prolonged exposure to low concentrations may also cause dental discoloration and erosion. The USEPA has not classified hydrochloric acid for carcinogenicity.

Acute Effects:

- Hydrochloric acid is corrosive to the eyes, skin, and mucous membranes. Acute inhalation exposure may cause coughing, hoarseness, inflammation and ulceration of the respiratory tract, chest pain, and pulmonary edema in humans.
- Acute oral exposure may cause corrosion of the mucous membranes, esophagus, and stomach, with nausea, vomiting, and diarrhea reported in humans. Dermal contact may produce severe burns, ulceration, and scarring.
- Pulmonary irritation, lesions of the upper respiratory tract, and laryngeal and pulmonary edema have been reported in rodents acutely exposed by inhalation.
- Acute animal tests in rats, mice, and rabbits, have demonstrated hydrochloric acid to have moderate to high acute toxicity from inhalation and moderate acute toxicity from oral exposure.

Chronic Effects (Noncancer):

- Chronic occupational exposure to hydrochloric acid has been reported to cause gastritis, chronic bronchitis, dermatitis, and photosensitization in workers. Prolonged exposure to low concentrations may also cause dental discoloration and erosion.
- Chronic inhalation exposure caused hyperplasia of the nasal mucosa, larynx, and trachea and lesions in the nasal cavity in rats.
- The reference concentration (RfC) for hydrochloric acid is 0.02 mg/m^3 based on hyperplasia of the nasal mucosa, larynx, and trachea in rats. The RfC is an estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without appreciable risk of deleterious noncancer effects during a lifetime. It is not a direct estimator of risk but rather a reference point to gauge the potential effects. At exposures increasingly greater than the RfC, the potential for adverse health effects increases. Lifetime exposure above the RfC does not imply that an adverse health effect would necessarily occur.
- The USEPA has low confidence in the study on which the RfC was based since it used only one dose and had limited toxicological measurements; low confidence in the database because the database does not provide any additional chronic or reproductive studies; and, consequently, low confidence in the RfC.
- The USEPA has not established an RfD for hydrochloric acid.

5.2.8 Acetic Acid

Acetic acid (systematically named ethanoic acid is an organic compound with the chemical formula CH_3CO_2H (also written as CH_3COOH). It is a colorless liquid that when undiluted is also called

glacial acetic acid. Acetic acid is the main component of vinegar (apart from water; vinegar is roughly 5% acetic acid by volume), and has a distinctive sour taste and pungent smell. It is mainly produced as a precursor to polyvinylacetate and cellulose acetate. Although it is classified as a weak acid, concentrated acetic acid is corrosive, and attacks the skin.

Acetic acid is one of the simplest carboxylic acids. It is an important chemical reagent and industrial chemical, mainly used in the production of cellulose acetate mainly for photographic film and polyvinyl acetate for wood glue, as well as synthetic fibers and fabrics. In households, diluted acetic acid is often used in descaling agents.

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

5.2.9 Sodium Hydroxide Solution (Caustic)

Sodium hydroxide (NaOH), also known as lye and caustic soda, is a caustic metallic base. It is used in many industries, mostly in the manufacture of pulp and paper, textiles, drinking water, soaps and detergents and as a drain cleaner. Pure sodium hydroxide is a white solid; available in pellets, flakes, and granules. It is hygroscopic and readily absorbs water from the air, so it should be stored in an airtight container. It is very soluble in water with liberation of heat.

Liquid sodium hydroxide is available is concentrations from 10 to 50% in water. These solutions are heavier than water and viscous. The solutions react violently with acids, aluminum metal, and chlorinated solvents.

Solid sodium hydroxide or solutions of sodium hydroxide will cause chemical burns, permanent injury or scarring, and blindness if it contacts unprotected human or animal tissue. Protective equipment such as rubber gloves, safety clothing and face & eye protection must be used when handling the material or its solutions. When transferring bulk quantities, workers should wear waterproof outer wear such as poly-coated Tyvek, or slicker suits and rubber boots as well as the basic protection described above.

Spilled material can be adsorbed and neutralized with sodium bicarbonate (baking soda). Flush skin and eyes exposed to caustic with large amounts of water. Flush eyes at least fifteen minutes with running, potable water.

5.2.10 Magnesium Hydroxide

Magnesium hydroxide powder is used industrially as a non-hazardous alkali to neutralize acidic wastewaters.

Solid magnesium hydroxide also has smoke suppressing and fire retarding properties. This is due to the endothermic decomposition it undergoes at 332 °C (630 °F):

$$Mg(OH)_2 \rightarrow MgO + H_2O$$

The heat absorbed by the reaction acts as a retardant by delaying ignition of the associated substance. The water released dilutes any combustible gases and inhibits oxygen from aiding the combustion.

Common uses of magnesium hydroxide as a fire retardant include plastics, roofing, and coatings. Other mineral mixtures that are used in similar fire retardant applications are natural mixtures of huntite and hydromagnesite.

5.2.11 Acid (Sulfuric Acid)

Acids represent a major class of chemical substances. An acid is a compound that ionizes in water to yield a hydrogen ion [H^+]. All acids have a pH of < 7, while bases have a pH of > 7. Acids vary in strength and corrosiveness, but all acids represent both an inhalation and skin contact hazard. Many acids are irritants to the

eyes, mucous membranes, and respiratory systems due to their affinity for water and ease in which they transition into the aqueous phase. Acids also represent a skin contact hazard due to their corrosiveness, in which skin may be severely damaged. Acids are frequently used in industrial cleaning processes and in the production of fertilizers and detergents.

The following information addresses the acids most commonly used in industrial cleaning and general maintenance activities. Should other acids be identified, supplemental information can be provided to this Addendum 1. However, since most acids share similar hazards and modes of exposure (inhalation and skin contact), the work procedures, monitoring requirements and protective equipment already required should be adequate to address these situations. The standard first aid treatment for acid spills on the skin is, as for other corrosive agents, irrigation with large quantities of water. Washing is continued for at least 10 to 15 minutes to cool the tissue surrounding the acid burn and to prevent secondary damage. Contaminated clothing is removed immediately and the underlying skin washed thoroughly.

Sulfuric (or sulphuric) acid (H_2SO_4) is a strong mineral acid. It is soluble in water at all concentrations. Sulfuric acid has many applications, and is one of the top products of the chemical industry. The corrosive properties of sulfuric acid are accentuated by its highly exothermic reaction (releases heat) with water. Burns from sulfuric acid are potentially more serious than those of comparable strong acids (e.g., hydrochloric acid), as there is additional tissue damage due to dehydration and particularly secondary thermal damage due to the heat liberated by the reaction with water. The OSHA PEL for sulfuric acid is 1 mg/m^3 and the ACGIH TLV is 0.2 mg/m^3.

5.2.12 Phosphoric Acid

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

5.2.13 Assessment of Exposure Hazards

Inhalation – Excavators and/or front end loaders produce large amounts of spoils, regardless of the depths obtained, soil is compressed to the sides of the hole rather than removed along an auger. For this reason, these earth removal practices increase the potential for the airborne release of contaminants. Appropriate dust and fugitive emission controls, as well as monitoring and the use of appropriate PPE will greatly minimize the potential for significant occupational exposures (this may include ensuring there is appropriate ventilation to reduce potential exposures such as sampling from the excavator bucket and maintaining an appropriate distance for the edge of the excavation).

Skin Contact – The potential entrainment of contaminated soils and water during this project is contact with contaminated soils and water, which can lead to entry through open wounds. Preventing this route of exposure necessitates the use of appropriate protective clothing and decontamination procedures.

Ingestion – The potential entrainment of contaminated soils and water presents an ingestion hazard to site workers during sampling activities. Protection against exposure via ingestion can be accomplished by performance of proper decontamination procedures when exiting contaminated work areas (see Section 8.2).

5.3 PHYSICAL HAZARDS

The physical hazards anticipated during this project are discussed below.

- Hazardous Noise – Workers may be exposed to hazardous levels of noise from drilling rig and supporting equipment. Hearing protection will be provided to all workers.
- Drill Rigs/Heavy Equipment – Drill rigs have rotating equipment that could entangle clothes and as well as hands/arms. Also, hydraulic lines operate under pressure and could rupture discharging heated

hydraulic fluid or the line could whip under pressure and strike a worker. When in motion, drill rigs could strike equipment, other vehicles, overhead power lines, or workers.

- Overhead Electrical Lines – The mast of the drill rig could contact overhead electrical lines causing electrocution of nearby workers or workers who were in contact with the rig. The drill rig could also catch fire when exposed to high voltage.
- Subsurface Utilities – The drill rig could drill into subsurface utility lines (e.g., electrical, fiber optic, gas line, etc.).
- Heat Stress – Summer in Texas can present outdoor workers with extreme heat stress resulting from temperatures in excess of 100 ^{o}F along with the high humidity.
- Power Hand/Manual Hand Tools –The use of manual hand or power tools presents workers with hazards such as cuts, abrasions, contusions, and electrocution (power tools only).
- Severe Weather – The SSHO will monitor local radio, National Oceanic and Atmospheric Administration weather radio, Internet weather sites, or other weather warning systems to plan for and identify possible severe weather situations at the project site. Site work may be delayed, postponed, or cancelled due to severe weather. Vehicle and equipment use at a site may also be restricted under unfavorable weather conditions.
- Lightning
  - Lightning can strike up to a distance of 10 miles, but thunder can only be heard at a distance of eight miles. If you can hear thunder, you are at risk of being struck by lightning.
  - Therefore, if site personnel working outdoors hear thunder or see lightning, work will be stopped and personnel will move to an indoor location.
  - If indoor facilities are not available, personnel should seek shelter inside passenger vehicles such as cars and pickups. Avoid touching metal parts of the vehicle.
  - During a thunderstorm avoid trees/poles, standing water, high areas, very low areas and streams, and metal structures (e.g., fences, scaffolding, etc.).
  - Work may resume 30 minutes following the final sound of thunder or observance of lightning, and when the storm is moving away from the work area.

5.4 UV HAZARDS

Exposure to UV radiation is typically the result of exposure to direct sunlight. Personnel are susceptible to extremely high to high levels of UV exposure ranging from April to mid-September. Protective clothing that is loose fitting and covers the arms provide protection against sunlight. Hats should shade the face, neck, and ears and have a wide brim (8 to 10 centimeters). Sunscreen should provide UVA and UVB protection and be a minimum of SPF 30. Sunglasses should be a close fitting wrap-round design and block at least 99% UV radiation. Chronic exposure to direct sunlight can cause skin cancer.

6.0 ACTIVITY SPECIFIC REQUIREMENTS

6.1 SUPPLEMENTAL SAFETY PROCEDURES

As discussed in Section 5.0, personnel may be exposed to a variety of chemical, physical, radiological, and biological hazards resulting from task- or equipment-specific activities. The requirements for the control of many of these hazards are discussed in SOPs found in the 300 to 500 Series of the U.S. Operations SH&E Manual.

Specific procedures applicable to this project include:

- S3NA-302-PR Electrical General
- S3NA-303-PR Excavation and Trenching
- S3NA-305-PR Hand and Power Tools
- S3NA-308-PR Manual Lifting
- S3NA-309-PR Mobile or Heavy Equipment
- S3NA-313-PR Wildlife, Plants and Insects
- S3NA-405-PR Drilling and Boring
- S3NA-406-PR Electrical Lines, Overhead
- S3NA-414-PR Railway Sites
- S3NA-417-PR Utilities, Underground
- S3NA-505-PR Cold Stress Prevention
- S3NA-507-PR Hazard Materials Communication / WHMIS
- S3NA-508-PR Hazardous Materials Handling and Shipping
- S3NA-509-PR Hazardous Waste Operations and Emergency Response
- S3NA-511-PR Heat Stress Prevention
- S3NA-520-PR Spill Response, Incidental
- S3NA-521-PR Decontamination

In addition, the following supplemental procedures have been developed to address requirements not covered within the established AECOM SOPs (SH&E 300 to 500-series). SOPs and supplemental procedures are specified on a task-specific basis in the individual THAs/JSAs found in Attachment A.

6.1.1 Slips, Trips, Falls, and Protruding Objects

A variety of conditions may exist that may result in injury from slips, trips, falls, and protruding objects. Slips and trips may occur as a result of wet, slippery, or uneven walking surfaces. To prevent injuries from slips and trips, always keep work areas clean; keep walkways free of objects and debris; and report/clean up liquid spills. Serious injuries may occur as a result of falls from elevated heights. Always wear fall protection while working at heights of six feet or greater above the next lower level. Protruding objects are any object that extends into the path of travel or working area that may cause injury when contacted by personnel. Always be aware of protruding objects and when feasible remove or label the protruding object with an appropriate warning.

6.1.2 Hazardous Noise Environments

Working around drill rigs and other heavy equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

AECOM has compiled noise monitoring data that indicates that work locations within 25 feet of operating heavy equipment (e.g., drill rigs, earthworking equipment) can result in exposure to hazardous levels of noise (levels greater than 90 decibels (dBA). Accordingly, all personnel are required to use hearing protection (earplugs or earmuffs) within 25 feet of any operating piece of heavy equipment.

6.1.3 Manual Lifting

Most materials associated with investigation, remedial, or construction-related activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process. Whenever possible, use at least two people to lift, or roll/lift with your arms as close to the body as possible. Under no circumstances should any one person lift more than 49 pounds unassisted. For additional requirements refer to S3NA-308-PR Manual Lifting, Field. Additional measures related to manual materials handling activities may be applicable.

6.1.4 Excavation and Trenches

Excavations and trenches present workers with a variety of hazards. If not properly sloped, shored, or boxed, trench walls may collapse and trap workers under the weight of the soil. Soil contaminants and other chemical hazards (e.g., carbon monoxide from equipment/vehicles) may result in a hazardous atmosphere. Confined space entry procedures may need to be followed if the potential for a hazardous atmosphere exists. Buried utilities may exist where excavations/trenches will be placed. Always contact the local utility locator service prior to beginning excavations.

All excavation and/or trenching activities must comply with S3NA-303-PR Excavation and Trenching. The excavation competent person must complete the Excavation Daily Inspection Checklist and provide the completed checklist to the SSHO or Site Supervisor for inclusion into the project files.

6.1.5 Ladder Safety

The following safe work practices will be adhered to during use of ladders:

- Assess work areas for fall hazards; a fall protection system is required if work is conducted six feet or higher
- Use Type 1A rated ladders
- Make sure ladder rungs are sturdy and free of cracks
- Use ladders with secure safety feet
- Pitch ladders at a 4:1 ratio
- Secure ladders at the top or have another person at the bottom to help stabilize it
- Ladders used to access an upper landing surface shall extend at least three feet above the upper landing surface
- Use non-conductive ladders near electrical wires
- The top step of a stepladder should not be used as a step
- Do not carry any object or load that could cause a loss of balance or a fall

6.1.6 Drill Rig Operations

The use of drill rigs in areas where unprotected personnel are working warrants special attention on the part of all personnel. Operators should ensure that equipment is working properly and is being run in a safe manner and should be aware of the location of unprotected personnel at all times while operating this machinery to avoid serious accidents.

In order to assure that all equipment used on-site presents no unwarranted safety hazards, the owner/operator of each drill rig must perform a safety evaluation and certification in accordance with the procedures and requirements found in S3NA-405-PR Drilling and Boring and complete the Drill Rig Safety Inspection Checklist. This checklist must be provided to the Site Supervisor/SSHO daily for inclusion in the project files. Any discrepancies noted on the checklist must be corrected prior to the initiation of drilling activities.

6.1.7 Flame, Heat, or Spark Producing Operations (Hot Work)

Because of the possibility of flammable materials being present at this site, flame, heat, or spark producing operations shall be limited. If a case arises where hot work is necessary, it shall be performed in accordance with AECOM S3NA-206-PR Fire Protection, Field.

This procedure requires a hot work permit and shall be inspected by the SSHO prior to commencing hot work. Combustible materials shall be removed from the area before the start of hot work. A fire watch shall be posted and the atmosphere shall be tested for combustible gases. A hot work permit shall be completed by the SSHO. The permit shall indicate the area, the employees involved, air monitoring results, fire protection systems, and fire department phone number. All flammable materials/fuels shall be stored in safety containers and backflow preventers shall be required for welding/cutting torches.

6.1.8 Fire Prevention and Protection

Clothes, cotton waste, and other combustible materials that might constitute a fire hazard will be placed in closed metal containers and placed outside or destroyed at the end of each day. AECOM will provide and maintain portable fire extinguishers in the following manner:

- Portable fire extinguishers will be provided, where needed, and inspected on a monthly basis. A visual inspection will be made to ensure that extinguishers are fully charged and in an operable condition.
- Hoses, nozzles, brackets, and supports will be inspected for deficiencies and corrected. Gauge pressure will be checked on pressurized units on a monthly basis to ensure units are fully charged and non-pressurized units will have their cartridges weighed on an annual basis. The chemical within dry chemical extinguishers will be inspected on an annual basis to ensure that it is powdery and in a free-running condition. An inspection tag will be attached to all extinguishers to designate that they have received an annual inspection. Fire extinguishers will be suitably placed, distinctly marked, and readily accessible.
- A fire extinguisher with a rating of not less than 10-B will be located within 50 feet or wherever more than five gallons of flammable gas are being used on the work site (this does not apply to integral fuel tanks of motor vehicles).
- A fire extinguisher with a rating of not less than 20-B will be located outside of and within 10 feet of the door opening into any room, building, or trailer used for storage of more than 60 gallons of flammable or combustible liquids.
- If flammable liquids are being stored in an outside location, at least one portable fire extinguisher with a rating of not less than 20-B will be located at least 25 feet from the storage area, but not more than 75 feet away.
- All tank trucks or vehicles used for transporting and/or dispensing flammable or combustible liquids will have a portable fire extinguisher with not less than a 20-BC rating.
- A portable fire extinguisher with a rating of not less than 20-BC will be placed within 50 feet of each service or fueling area at the project site.
- Fire extinguishers will be placed in storage areas so they are capable of extinguishing materials being stored.
- All fire extinguishers will be approved by a nationally recognized testing laboratory.
- A fire extinguisher with a rating of not less than 2-A will be provided where torches or open flames are in use.
- At least one dry chemical or carbon dioxide fire extinguisher, with a 5-BC rating minimum, will be available for placement on each unit of heavy equipment, and each site vehicle (excluding rental cars).

- Fuel handling is another hazard which will be present during this task. Refueling of the mechanical equipment poses burn hazards. All refueling and fuel handling equipment must be Underwriters Laboratories listed and Factory Mutual approved. The refueling must be done in a designated area to prevent contamination from minor spills and to reduce the risk of fires. The following guidelines must be followed whenever personnel are dispensing flammable and combustible liquids:
- Flammable liquid dispensing systems will be electrically bonded and grounded. All tanks, hoses, and containers of five gallons or less will be kept in metallic contact while flammable liquids are being transferred; transfer of flammable liquids in containers in excess of five gallons will be done only when the containers are electrically bonded.
- Flammable or combustible liquids will be drawn from, or transferred into, vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited.
- Areas in which flammable or combustible liquids are transferred in quantities greater than five gallons from one tank or container to another will be separated from other operations by at least 25 feet or a barrier having a fire resistance of at least one hour. Drainage or other means will be provided to control spills.
- Natural or mechanical ventilation will be provided to maintain the concentration of flammable vapor at or below 10% of the lower explosive level.
- Dispensing units will be protected against collision damage.
- Dispensing nozzles and devices for flammable liquids will be of an approved type.
- Lamps, lanterns, heating devices, and similar equipment will not be filled while hot. These devices will be filled only in well-ventilated rooms free of open flames or in open air and shall not be filled in storage buildings.

6.1.9 Small Quantity Flammable Liquids

Small quantities of flammable liquids shall be stored in safety cans and properly labeled as to their contents.

6.1.10 Explosive Hazards

Explosive materials produced and handled at LHAAP included cyclonite, TNT, and black powder, rocket propellants, and pyrotechnics. Rocket propellants contained a rubber binder, an oxidizer (ammonium perchlorate), and a powdered aluminum fuel. Pyrotechnics were generally composed of sodium nitrate, magnesium powder, and a binder. The sites of explosive concern include Sites 29, 46, and 47.

Avoidance will be practiced if explosive materials or objects are suspected or encountered. All work will be immediately halted, personnel will move upwind away from the suspected material, and the PM will be immediately notified for further instructions. Work shall not be resumed until clearance has been obtained for the specific sampling location or a different sampling location is selected with no visible explosive concern.

6.1.11 Powered Hand Tools

The use of any powered hand tool will comply with the requirements in S3NA-305-PR Hand and Power Tools. All electrically powered hand tools will be connected through a ground fault circuit interrupter (GFCI). All tools will be inspected prior to use. For those tool(s) that are damaged or otherwise defective, the tool will be red tagged and taken out of service. Workers utilizing powered hand tools will be provided with the applicable Equipment Safety Cards in Attachment C and briefed regarding the hazards presented by that particular tool. All workers must be trained on the use of the particular tool they are utilizing and this training must be documented. The SSHO/Site Supervisor will maintain the training records onsite.

6.1.12 Groundwater Level Static Checks

Prior to performing any groundwater level static checks ensure a photoionization detector (PID) is present and field checked for operational compliance. Obtain appropriate instrument for measuring water level and ensure it is operating correctly prior to departing to the field. If the groundwater level you are measuring is in a preexisting well use caution while opening well cap for critters that may have entered and let it air out for 15 minutes. Use the PID to measure the head space (see section 6.2.1, Table 6-2) and if the air meets acceptable criteria proceed with the tasking.

6.1.13 Soil Sampling

Soil samples can be collected from Geo-probe points, hand auguring, from the surface and during well installation activities. During sampling activities, appropriate air monitoring will be conducted and the appropriate chemical resistant PPE will be worn to protect against exposure. The major activities involved with collecting samples from the site and surrounding properties include the following:

- Pre-sampling event notifications and approval
- Set-up for sampling activities
- Soil samples will be collected during well installation activities using hollow stem auger drilling techniques or from Geo-probe points
- Sample preparation and sample shipping
- Administrative activities

6.1.14 Lockout/Tagout of Hazardous Energy Sources

Lockout/tagout procedures will be implemented to assure the safety of personnel during servicing or maintenance of machines and equipment where the unexpected release of stored energy or the energization of these machines or equipment could cause employee injury. These procedures are contained in S3NA-410-PR Hazardous Energy Control and comply with the requirements established in 29 CFR 1926.417. All portable electrical equipment and extension cords shall be protected with a GFCI as part of the circuit. The applicable requirements found in 29 CFR 1926, Subpart K, *Electrical* shall be implemented and S3NA-302-PR Electrical, General.

Subcontractors may implement their own lockout/tagout procedure if the Safety Professional has approved its use and verifies that it is no less protective than the AECOM procedure.

It is the responsibility of AECOM employees to verify that all remediation equipment is locked out before AECOM employees perform any maintenance or repair work on the system. The source must be locked out. It is not enough to push the power switch to off and disconnect the breaker. Anyone can re-engage power under these circumstances. Locking out the power source is the only way to guarantee that the power will not be inadvertently reactivated.

A lock-out/tag-out kit will be located in the treatment shed for the duration of the project. The kit includes standard locks, keys and lock-out notices.

The site specific lock-out/tag-out information must be completed. These forms will then be placed within the LHAAP field office so all field technicians performing operations and maintenance work on the system are familiar with how to lock-out the system when necessary.

6.1.15 Electrical Power

All electrical equipment must have a GFCI as part of the circuit. All equipment must be suitable and approved for the class of hazard. Temporary wiring conductors installed for operation of construction tools and equipment will be either Type TW or THW contained in metal raceways, or will be hard usage or extra hard usage multi-conductor cord. Temporary wiring will be secured above the ground or floor in a workmanlike manner and will not present an obstacle to persons or equipment. Applicable OSHA standards for electrical power, 29 CFR 1926 Subpart K and S3NA-302-PR Electrical, General shall apply.

6.1.16 Heavy Equipment Safety

There may be various types of heavy construction equipment that AECOM may be using during the execution of this project. All operators of this equipment will be familiar with the requirements for inspection and operation of the equipment they will be using. Before equipment is placed into use, it will be inspected by the operator to ensure that it is in safe operating condition. The following guidelines will be adhered to while operating heavy construction equipment:

- Equipment will not be operated in a manner that will endanger persons or property nor will the safe operating speeds or loads be exceeded.
- Getting off or on any equipment while it is in motion is prohibited.
- Use the three-point contact rule when getting on and off of equipment.
- Always clear the tracks with debris to ensure good footing and to prevent slippage, especially in wet conditions.
- Spotters will be used to back-up equipment and direct traffic in all "blind" areas.
- Equipment will be operated in accordance with the manufacturer's instructions and recommendations.
- Determinations of road conditions and structures will be made in advance to assure that clearances and load capacities are safe for the passage of equipment.
- All machinery or equipment will be shut down and positive means taken to assure that clearances and load capacities are safe for the passage of equipment.
- Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being done. Equipment designed to be services while running are exempt from this requirement.
- Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment will be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the engines stopped and brakes set, unless work being performed on the machine requires otherwise.
- No guard, safety appliance, or device will be removed from machinery or equipment, or made ineffective except for making immediate repairs, lubrications, or adjustments, and them only after the power has been shut off. All guards and devices will be replaced immediately after completion of repairs and adjustments and before power is turned on.
- Mechanized equipment will be shut down prior to and during fueling operations. Closed systems, with automatic shut-off which will prevent spillage if connections are broken, may be used to fuel diesel powered equipment left running.
- Each bulldozer, scraper, dragline, crane, motor grader, front-end loader, mechanical shovel, backhoe, and other similar equipment will be equipped with at least one dry chemical or carbon dioxide fire extinguisher with a minimum rating of 5-B;C.
- Personnel will not work or pass under or ride in the buckets or booms of loaders in operations.
- All self-propelled construction equipment, whether moving alone or in combination, be equipped with a reverse signal alarm.
- Standard hand signals will be used to communicate between operators and ground crew.
- All heavy equipment will be equipped with operable seat belts; belts will be used by all operators.

In order to assure that all equipment used on-site presents no unwarranted safety hazards, the owner of each piece of heavy equipment must perform a safety evaluation and certification in accordance with the procedures and requirements found in S3NA-309-PR Mobile or Heavy Equipment. The owner/vendor supplying the heavy equipment must complete the S3NA-309-FM1 Certification Form for Machinery and Mechanized Equipment and then submit the completed form to the SSHO prior to the equipment's use onsite. Each operator must

complete the S3NA-309-FM2 Heavy Equipment Pre-Operations Inspection Checklist daily and submit the completed form(s) to the SSHO at the end of the week/month.

6.1.17 Traffic Safety

In order to ensure the safety of pedestrians, local traffic, and site workers, a traffic control measures will be established for the site activities that may be required in high traffic zones, streets, parking lots, or other locations where vehicular traffic may present a potential hazard to workers. All individuals working on this site must wear a Type II or Type III reflective traffic safety vest. All traffic routes and traffic diversion measures such as road closures, lanes closures, and the establishment of barricades or other traffic diversion signals will meet the minimum requirements identified in S3NA-303-PR Highway and Road Work.

6.1.18 Elevated Work Platforms and Aerial Lifts

The use of aerial lifts presents a unique set of hazards to employees using, and working around the equipment. Proper training on the safe usage of the specific type of lift being utilized is essential to the safe execution of work tasks with the equipment. Besides the daily inspections and safe usage of the equipment, there are numerous other safety related issues that need to be assessed during their use, to include fall protection, safe working surfaces, and overhead power lines.

6.1.19 Working at Heights

The following are U.S. standards. Fall Protection - Fall Protection Systems shall comply with OSHA Regulations (Standards – 29 CFR) Standard # 1926.502 Fall Protection Systems Criteria and Practices and OSHA Standard # 1926.502(d) – 1926 Subpart M App C Personal Fall Arrest Systems.

Specifically, anyone working in an area exposed to a fall greater than six feet must use appropriate fall protection. Such protection includes: guardrail systems, safety net systems or personal fall arrest systems. Other protection methods include hole-covers, positioning devices, equipment guards, fences and barricades. Fall protection shall be provided as required in OSHA Regulations 29CFR1910 and 29CFR1926, reference: standard 1926.501 Duty to Have Fall Protection.

Work above a height of six feet requires a fall protection system. This project requires 100% tie off using full-body harness (Class III or IV) with dual shock-absorbing lanyard (shorter than fall distance and a maximum six feet long) equipped with double-locking hooks connected to a proper tie-off attachment point capable of handling potential fall loads of 5,000 pounds.

Fall protection systems classified as “job made” (not purchased approved fall prevention devices from a fall protection supplier) shall be designed by a Registered Professional Engineer. Fall protection or restraining methods shall be in place when employees are within six feet of the leading or exposed edge, where a fall hazard exceeding six feet exists, such as during decking activities, inspecting structures, climbing, trenching, etc.

6.1.20 Working On or Near the Water

The buddy system should be utilized whenever there is the possibility of falling into water, in which two persons operate as a single unit in order to monitor and assist each other in performing tasks. Whenever there exists the possibility of falling into water, personnel must be attired in a USCG approved Type III or Type V work vest. The vest must be properly sized for the individual and must be secured at all times. A throwable rescue device (Type IV flotation aid) along with whatever equipment (i.e., ladders, lifting gear, or rescue boat) necessary shall be immediately available to recover an individual from the water.

Waders may not be worn when working along, over, or in moving waters; or in waters influenced by tides or acted upon by waves when water depths exceed knee height, unless specifically approved by the SH&E Manager. Waders may be worn in still waters in water depths up to the waist if bottom conditions are firm and well understood. Waders shall never be worn aboard a watercraft of any kind.

If workers have the potential to get stuck in mud or fluidized sediment, air injection equipment designed to free workers feet/legs may need to be available onsite. At a minimum, a safety line should be available to be deployed from safe ground. If a worker does get stuck, they should not struggle as this causes further sinking.

Use a pole to conduct sediment probing to assess water depths, the stability of shoreline terrain, and the bearing capacity of bottom sediments ahead of the chosen path.

Take special care on slippery rocks along shorelines, lakeshores, riverbanks, and creeks. Always look ahead at the ground when walking around the water's edge and avoid stepping on stones that have algal growth, especially those in intertidal areas, as these are extremely slippery. It is suggested that workers not be permitted to access areas where these slip/fall hazards exists, especially in locations containing tidal water flow.

6.1.21 Subsurface Utilities

Various forms of underground/overhead utility lines or pipes may be encountered during site activities. Prior to the start of intrusive operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. Should intrusive operations cause equipment to come into contact with utility lines, the SSHO and the Safety Professional will be notified immediately. Work will be suspended until the applicable utility agency is contacted and the appropriate actions for the particular situations can be taken. For this project, the national one-call 811 number or the Texas One-Call service 800-669-8344 may be used. The following precautions should also be observed:

- Obtaining as-built drawings for the areas being investigated from the property owner;
- Visually reviewing each proposed soil boring locations with the property owner or knowledgeable site representative;
- Performing a geophysical survey to locate utilities;
- Hiring a private line locating firm to determine the location of utility lines that are present at the property;
- Identifying a no-drill zone; or
- Hand digging in the proposed soil boring locations if insufficient data is available to accurately determine the location of the utility lines.

6.1.22 Overhead Utilities

All overhead lines will be considered "energized" unless properly de-energized, grounded and tested by the utility company before working within the clearance distance as defined below. The AECOM SSHO must observe de-energizing process and reconfirm that the lines are de-energized on a daily basis. Any vehicle or mechanical equipment that is capable of having parts of its structure elevated near energized overhead lines shall be operated so that a minimum clearance of 10 feet is maintained at all times. This 10 foot distance shall be increased a minimum of 0.4 inches for each 1 kilovolt over 50 kilovolt. If the voltage of the overhead line is unknown, maintain a clearance of 35 feet.

Precautions must be taken when handling lengths of pipe or tubing that can approach overhead power and utility lines. When working with pipe or tubing, maintain a distance equal to the length of pipe plus the clearance distance defined above.

6.1.23 Confined Space Entry

If any operation is conducted in an area classified as a permit-required confined space by OSHA, a "Confined Space Entry Permit" will be completed and all applicable procedures meeting the requirements of 29 CFR 1910.146 will be implemented.

Confined spaces pose unique problems due to their unique contents and/or configuration. Some confined spaces, for example, pose entrapment hazards for entrants, while others restrict air circulation so that hazardous atmospheres may accumulate quickly. Confinement itself can increase the risk of injury or death by making personnel work closer to hazards than they would otherwise. OSHA considers an area to be a Permit Required Confined Space if it is an enclosed space which:

- Is large enough and so configured that an employee can bodily enter and perform assigned work;
- Has limited or restricted means for entry and exit (e.g., tanks, vessels, silos, storage bins, hoppers, vaults, pits, and diked areas);
- Is not designed for continuous employee occupancy; or

- Has one or more of the following characteristics:
  -Contains or has a potential to contain a hazardous atmosphere;
  -Contains a material with the potential for engulfment of an entrant;
  -Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls, or a floor which slopes downward and tapers to a smaller cross-section; or
  -Contains any other recognized serious safety or health hazard.

Does this project require personnel to enter a Permit Required Confined Space as defined above?

No: ☐	**Yes:** ☐

If the answer is **NO**, proceed to the next section. If the answer is **YES**, OSHA regulations for Confined Space Entry (29 CFR 1910.146) must be implemented and personnel must comply with all Confined Space Entry procedures, as follows:

- Complete and submit a Confined Space Entry Permit
- Certify that all personnel have completed the OSHA 40-hour course in Health and Safety and are current with their 8-hour refresher training
- Certify that all personnel are enrolled in a medical surveillance program and are physically capable of performing a confined space entry
- Certify that all personnel have successfully passed a respirator fit-test within the past year
- Identify entrants and ensure they are properly trained and understand their duties
- Identify attendants and ensure they are properly trained and understand their duties
- Identify a rescue team or make arrangements with an outside agency for rescue assistance. If site personnel are assigned to a rescue team, ensure that the personnel are properly trained and are familiar with the operation, capabilities, and maintenance of rescue equipment
- Ensure that at least one member of the rescue team is current in his/her First Aid and CPR certification
- Ensure that the entry permit contains the required information before authorizing entry
- Determine that the necessary procedures, practices, and equipment for safe entry are in effect before allowing entry
- Determine, at appropriate intervals, that entry operations remain consistent with the terms of the entry permit, and that acceptable entry conditions are present
- Cancel the entry authorization and terminate entry whenever acceptable conditions are not present
- Take the necessary measures for concluding an entry operation, such as closing off a permit space and canceling the permit, once the work authorized by the permit has been completed
- Take the appropriate measures to remove unauthorized personnel who are in or near permit spaces

6.1.24 Dust and Odor Control

Specific controls will be in place to prevent dust generation. If dust is observed reaching or approaching the site boundary, activities causing the dust will be immediately stopped. Dust control measures (water spray, soil covers, slower work pace, or change in work activities) will be deployed prior to resuming work. Corrective measures will be documented in the daily report.

Due to the nature of the contaminant at the site, odors are not anticipated to be of concern. In the event that an odor complaint is received, the SSHO and/or SSHO will immediately assess site conditions and determine the probable cause or causes. Appropriate odor mitigation measures will be deployed. These measures may include covering sediment piles, deploying odor suppressing foam, implementation of air monitoring or discontinuing activities that are generating the odor. Corrective measures will be documented in the daily report.

6.1.25 Spill Prevention

Work activities may involve the use of hazardous materials (i.e., fuels, solvents) or work involving drums or other containers. The following procedures will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers
- Tops/lids will be placed back on containers after use
- Containers of hazardous materials will be stored appropriately away from moving equipment

At least one spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material (i.e., speedy dri) shall be available at each work site (more as needed). All hazardous commodities in use (i.e., fuels) shall be properly labeled. Containers shall only be lifted using equipment specifically manufactured for that purpose.

6.2 EXPOSURE MONITORING PROCEDURES

Monitoring procedures will be employed during site characterization activities to assess employee exposure to chemical and physical hazards (if required). Monitoring will consist primarily of onsite determination of various parameters (e.g., airborne contaminant concentrations and heat stress effects), but may be supplemented by more sophisticated monitoring techniques, if necessary.

6.2.1 Real-Time Exposure Measurement

Monitoring shall be performed within the work area on-site in order to detect the presence and relative levels of toxic substances (if required). The data collected throughout monitoring shall be used to determine the appropriate levels of PPE. Monitoring shall be conducted as specified in each THA/JSA (Attachment A) as work is performed.

Table 6-1 specifies the real-time monitoring equipment, which will be used for this project as required.

Table 6-1: Monitoring Parameters and Equipment

INSTRUMENT	MANUFACTURER/MODEL*	SUBSTANCES DETECTED
PID	RAE Systems mini-RAE Photovac Microtip HNu Model Hnu (min. 10.2 eV bulb)	Petroleum hydrocarbons Organic Solvents
Aerosol Monitor	MIE Model PDM-3	Aerosols

*Or similar unit, as approved by the SH&E Professional

6.2.1.1 Health and Safety Action Levels

An action level is a point at which increased protection is required due to the concentration of contaminants in the work area or other environmental conditions. The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level. The action levels are based on concentrations in the breathing zone.

If ambient levels are measured which exceed the action levels in areas accessible to unprotected personnel, necessary control measures (barricades, warning signs, and mitigative actions, etc.) must be implemented prior to commencing activities at the specific work area.

Personnel should also be able to upgrade or downgrade their level of protection with the concurrence of SSHO or the Safety Professional.

Reasons to upgrade:

- Known or suspected presence of dermal hazards
- Occurrence or likely occurrence of gas, vapor, or dust emission
- Change in work task that will increase the exposure or potential exposure to hazardous materials

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally suspected
- Change in site conditions that decrease the potential hazard
- Change in work task that will reduce exposure to hazardous materials

6.2.1.2 Site Activities Monitoring Procedures

The applicable monitoring procedures outlined in Table 6-2 will be followed during subsurface drilling activities, including the simultaneous collection of soil samples from the spoons, well development, and groundwater sampling (as required).

Table 6-2: Action Levels and Monitoring Procedures for Site Activities

PARAMETER	ZONE LOCATION AND MONITORING INTERVAL	RESPONSE LEVEL (Action Levels, ABOVE BACKGROUND)	RESPONSE ACTIVITY
VOCs (total by MultiRAE)	Breathing zone, continuously during sampling	< 10 units	Continue work in required PPE and continue monitoring
		10 to 25 units (sustained for more than 5 minutes)	Continue work in required PPE, continue monitoring, and use benzene detector tubes
		25 to 50 units (sustained for more than 5 minutes)	Contact the SSHO, implement mitigation measures, upgrade PPE to Level C (organic vapor cartridge)
		> 50 units (sustained for more than 5 minutes)	Cease work, exit, and contact the SP and PM
VOCs (total by MultiRAE)	Edge of EZs, every 30 minutes during sampling	< 10 units	Continue work in required PPE, monitor air, and implement engineering controls
		> 10 units (sustained for more than 5 minutes)	Continue mitigation measures and contact the SSHO
Explosivity (total by LEL)	Breathing Zone and edge of EZ during sampling	< 0.1% LEL (sustained for more than 15 minutes)	Continue work in required PPE and continue monitoring
		> 0.1% LEL (sustained for more than 15 minutes)	Cease work, exit, and contact the H&SP and SSHO
Oxygen (%)	Breathing Zone while sampling	<19.5%	Cease work, exit, and contact the H&SP and SSHO
		19.5 to 23.5%	Continue work in required PPE and continue monitoring
		>23.5%	Cease work, exit, and contact the H&SP and SSHO
Aerosols (total by aerosol monitor)	Breathing zone every 30 minutes during excavation (Below Action Levels)	0 to 5 mg/m^3	Continue work in Level D PPE and continue monitoring
		>05 to 10 mg/m^3	Upgrade to Level C PPM, Implement dust suppression measures until <5; contact the SSHO & H&SP
		>10 mg/m^3	Cease activities, implement more effective dust suppression measures; contact the SSHO & H&SP
Aerosols (total by aerosol monitor)	Edge of EZ, every 30 minutes during excavation activities (Below Action Levels)	<05 mg/m^3	Continue work in required PPE, monitor air, and implement engineering controls.
		>05 mg/m^3	Cease activities and contact the SSHO & H&SP

Note: All VOC monitoring will be conducted using PID only.

6.2.1.3 Monitoring Equipment Calibration

All instruments used will be calibrated at the beginning and end of each work shift, in accordance with the manufacturer's recommendations. If the owner's manual is not available, the personnel operating the equipment will contact the applicable office representative, rental agency or manufacturer for technical guidance for proper calibration. If equipment cannot be pre-calibrated to specifications, site operations requiring monitoring for worker exposure or off-site migration of contaminants will be postponed or temporarily ceased until this requirement is completed.

6.2.1.4 Personal Sampling

Should site activities warrant performing personal sampling to better assess chemical exposures experienced by AECOM employees, the SSHO, under the direction of a Certified Industrial Hygienist (CIH), will be responsible for specifying the monitoring required. Within five working days after the receipt of monitoring results, the CIH will notify each employee, in writing, of the results that represent that employee's exposure. Copies of air sampling results will be maintained in the project files.

If the site activities warrant, the subcontractor will ensure its employees' exposures are quantified via the use of appropriate sampling techniques. The subcontractor shall notify the employees sampled in accordance with health and safety regulations, and provide the results to the SSHO for use in determining the potential for other employees' exposure.

6.2.2 Biological Hazard Injury and Illness Prevention

Contact with bodies of water, animals, insects, and plants can cause injury and illness to personnel. Care must be taken to ensure that these types of injuries are avoided. Preventative measures are outlined in S3NA-313-PR Wildlife, Plants and Insects. Some examples of biological hazards include:

1. Natural and artificial bodies of water (e.g., lakes, rivers, ponds, lagoons, etc.) may contain a variety of microorganisms. Microorganisms, in particular, present a significant hazard to personnel who may come into contact with water bodies. Contact with microorganisms in water may result in dermatitis, infection (i.e., in cuts/lacerations), digestive distress, and other diseases. Always be aware of areas that may contain excessive amounts of microorganisms. Such areas may include areas of standing water; areas of warm water (i.e., cooling tower effluents, etc.); and areas downstream of municipal wastewater treatment. To prevent exposure to microorganisms in water, always adhere to the following:
    - Wear protective gloves (i.e., nitrile, etc.) and other appropriate PPE to prevent skin contact with water.
    - Never drink from natural or artificial bodies of water. Such water is considered non-potable and is not safe for drinking.
2. Wild animals, such as snakes, raccoons, squirrels, and rats. These animals not only can bite and scratch, but can carry transmittable diseases (e.g., rabies). Avoid the animals whenever possible. If bitten, go to the nearest medical facility.
3. Insects such as mosquitoes, ticks, bees, and wasps. Mosquitoes can potentially carry and transmit the West Nile Virus. Ticks can transmit Lyme disease or Rocky Mountain Spotted Fever. Bees and wasps can sting by injecting venom, which causes some individuals to experience anaphylactic shock (extreme allergic reaction). Whenever you will enter areas that provide a habitat for insects (e.g., grass areas, woods), wear light-colored clothing, long pants and shirt, and spray exposed skin areas with a DEET-containing repellent. Keep away from high grass wherever possible. Keep your eyes and ears open for bee and wasp nests. If bitten by insects, see a doctor if there is any question of an allergic reaction.
4. Plants such as poison ivy and poison oak can cause severe rashes on exposed skin. Be careful where you walk, wear long pants, and minimize touching exposed skin with your hands after walking through thickly vegetated areas until after you have thoroughly washed your hands with soap and water. Examples of common poisonous or irritating plant species, common to the U.S., are shown in Table 6-3.

Table 6-3: Hazardous Plant Identification Guide

Poison Ivy • Grows in West, Midwest, Texas, East • Several forms – vine, trailing shrub, or shrub • Three leaflets (can vary 3-9) • Leaves green in summer, red in fall • Yellow or green flowers • White berries	
Poison Oak • Grows in the East (New Jersey to Texas), Pacific Coast • Six foot tall shrubs or long vines • Oak-like leaves, clusters of three • Yellow berries	
Poison Sumac • Grows in boggy areas, especially in the Southwest and Northern states • Shrub up to 15 feet tall • Seven to 13 smooth-edged leaflets • Glossy pale yellow or cream-colored berries	

6.2.2.1 Response Measures for Contact with Hazardous Plants

If you have been exposed to poison ivy, oak, or sumac, act quickly because the toxin in the plants penetrates the skin within minutes. If possible, stay outdoors until you complete the first two steps:

1. Cleanse the exposed skin with generous amounts of isopropyl alcohol.
2. Wash the skin with water.
3. Take a regular shower with soap and warm water. Do not use soap until this point because it will pick up the toxin from the surface and move it around.
4. Wash clothes, tools, and anything else that may have been in contact with the toxin, with alcohol and water. Be sure to wear hand protection during that process.

Signs and symptoms of exposure include redness and swelling that appears five minutes to two hours after exposure. Blistering and itching will follow. If you have had a severe reaction in the past, you should see an occupational physician right away. After binding, plain soap and water may not be effective in removing urushiol (the oil commonly disseminated by these particular plants). Otherwise, according to the Federal Drug Administration , there are quite a few effective over-the-counter (OTC) products to help with symptoms, including Cortaid and Lanacort, baking soda, Aveeno oatmeal bath, and calamine lotion. These OTC remedies may produce mild and temporary relief of the itch but will not remove the oil. Again, cleanse immediately after exposure w/plain soap/water, then wash with products like OTC Zanfel per package instructions. Wash all

clothing/bedding in hot soapy water since urushiol oil from the plant will stay on them and if worn/touched, will continue to re-expose if contracted with any part of one's skin. AECOM's occupational care consultant, or a pharmacist, can help you make an educated choice.

6.2.3 Alligators

Alligators are known to be present in the waters of Texas and Louisiana. When working within 100 feet of surface waters assume that you are in the presence of alligators. Alligators that are six feet or larger present the greatest hazard. Smaller alligators, four feet or less, pose little threat to people, but a bite from any alligator could result in serious infection. Regardless of how minor a bite appears, it would be wise to consult a physician immediately.

- Always be aware of what is around you to avoid unexpected encounters.
- Under no circumstances should you approach an alligator closely they are quite agile. As with any wild animal, alligators merit a measure of respect.

An alligator nest is a pile of rotting grass, other vegetation and mud. The pile is 3 1/2 to six feet across and one to two feet high, sitting in a site 13 to 18 feet across that has been cleared of vegetation. The female alligator stays close to guard the eggs from raiding raccoons, skunks and opossums. After the eggs hatch in late summer, the pod of baby alligators will stay together through their first winter and often through their second winter as well. The mother alligator stays close to her pod of babies, protecting them from male alligators, herons and humans.

6.2.4 Snakes

Venomous snakes can be encountered on or near the project site. Efforts should be made to keep away from all snakes.

If bitten, stay calm and seek help. Do NOT cut the bite area, but use a snakebite kit if available. Try to be able to identify the snake to medical personnel. Remember that bites of non-venomous snakes can become infected. Get medical attention for any animal bite.

The following photos provide an illustration of common poisonous snakes that may be found in ponds and waters throughout portions of Texas and- Louisiana. Those working in the field should never attempt to handle snakes.

6.2.5 Rodents

Rodents, such as rats and deer mice, can potentially carry Hantavirus. Rats differ from related mice by their larger size and teeth. Deer mice, such as mesas, usually live at higher elevations, and can be distinguished from other rodents by their small size (Two to four inches long) and by their bi-colored tail. However, the Centers for Disease Control believes that other rodents also have the potential to carry the virus, so precautions must be taken when dealing with any species of rodent. It is not possible to distinguish whether a rodent carries the Hantavirus by observation.

Hantavirus affects the respiratory system in humans. The first symptoms of infection can occur at any time up to 45 days after exposure, and includes one or more of the following: fever, muscle aches, headache, or coughing. These symptoms progress rapidly into a severe lung disease that often requires intensive care treatment. Hantavirus can be transferred to humans, primarily from breathing infected rodent excreta particles

that have become airborne or ingesting excreta particles that cling to hands or clothing. It can also be contracted from rodent bites or transferred through broken skin. Though the illness caused by Hantavirus is severe, it is relatively rare and can be prevented by simple precautions and common sense.

The best way to avoid contact with the Hantavirus is to avoid contact with rodents and their excreta. Do not leave food or garbage where rodents have access to them; this includes leaving food items and wrappers in vehicles. When possible, seal any opening greater than ¼ inch diameter with steel wool to prevent rodent access in vehicles or structures.

Minor amounts of rodent excreta and rodents caught in mouse traps may be disposed of by personnel, provided precautions are taken. A suggested procedure is:

- When excreta or dead rodents are discovered in an enclosed area, ventilate the area for 30 minutes; the more air flow the better
- Wear the proper PPE
- Implement dust suppression techniques (such as use of a "bug" sprayer filled with water and a small amount of detergent to lightly spray the floor prior to entry)
- To dispose of wastes, place the rodent excreta or dead rodents in a plastic bag. Rinse gloved hands with bleach solution of one part bleach or 10 parts water, then rinse off any PPE in proper order, placing disposable items such as boot covers and respirator cartridges, in with the wastes. Place the respirator, if any, into a plastic bag, and mark the bag as "POTENTIALLY INFECTIOUS." Wet the wastes with the bleach solution, seal the plastic bag, place it into a second bag, and seal this bag also. Spray the outside of the plastic bag with commercial spray disinfectant. The waste may be disposed of as regular garbage
- After the wastes are properly bagged, spray the surfaces where the wastes originally were found with disinfectant
- Thoroughly wash hands, face, and forearms with soap and water

6.2.6 Ticks

Ticks are vectors of many different diseases, including Rocky Mountain spotted fever, Q fever, tularemia, Colorado tick fever, and Lyme disease. They attach to their host's skin and intravenously feed on blood, creating an opportunity for disease transmission. Covering exposed areas of the body and the use of tick repellent are two ways to prevent tick bites. Periodically during the workday, employees will inspect themselves for the presence of ticks. If a tick is discovered, the following procedure should be used to remove it:

- Do not try to detach a tick with bare fingers; bacteria from a crushed tick may be able to penetrate even unbroken skin. Fine-tipped tweezers should be used
- Grip the tick as close to the skin as possible and gently pull it straight away from the skin until it releases its hold
- Do not twist the tick while pulling, and do not squeeze its bloated body. That may actually inject bacteria into the skin
- Thoroughly wash hands and the bite area with soap and water, and apply an antiseptic to the bite area
- Save the tick in a small container and note the date, the body location of the bite, and where the tick came from
- Notify the SSHO of tick bites as soon as possible

Recently, Lyme disease has been the most prevalent type of disease transmitted by ticks in the U.S.

6.2.7 Chiggers

Probably no creature on earth can cause as much torment for its size than the tiny chigger. Tiny six-legged chigger larvae attack campers, picnickers, hikers, bird watchers, berry pickers, fishermen, soldiers, and homeowners in low, damp areas where vegetation is rank such as woodlands, berry patches, orchards, along

lakes and streams, and even in drier places where vegetation is low such as lawns, golf courses, and parks. They are most numerous in early summer when grass, weeds and other vegetation are heaviest. Chiggers do not burrow into the skin, but insert their mouthparts in a skin pore or hair follicle. Their bites produce small, reddish welts on the skin accompanied by intense itching as irritating as acute cases of poison ivory or poison sumac. These symptoms often are the only way of learning that an outdoor area is infested since chiggers are so small that most cannot be seen without a magnifying glass. Chiggers feed on a wide variety of snakes, turtles, birds, and small mammals as well as humans.

Prevention Mowing of briars, weeds, and thick vegetation and close clipping of lawns, to eliminate shade and moisture, will reduce chigger populations, and permit sunlight and air to circulate freely. Chigger larvae can penetrate many types of clothing, but high boots and trousers of tightly woven fabric tucked into stockings or boots help deter them. Before going into an area where chiggers may be present, protect yourself by using a repellent such as deet (Off MGK, Muskol, Detamide, Metadelphene, Repel, Diethy-toluamide) or permethrin available at many drugstores or hardware stores. Deet-based repellents are effective for only a few hours, whereas permethrin-based repellents are for use only on clothing and effective for several days. Apply the repellent to both the skin (permethrin should not be sprayed on skin) and clothing, especially on hands, arms, or legs, if uncovered, and to clothing openings at cuffs, neck, waistband, and upper edges of socks. Follow label directions since repellents may damage plastics, nail polish, and painted or varnished surfaces. Do not use indiscriminately as severe human allergies can develop. Keep moving since the worst chigger infestations occur when sitting or laying down in a sunny spot at midday with temperatures above 60 °F. If possible, stick to roads and trails.

6.2.8 Scorpions

Several species of scorpions are found in the south. Only one species, the Bark Scorpion, is regarded as life threatening. The Bark Scorpion may be distinguished from other less toxic species by its more slender tail segments and pincers. Reaching only 1 1/2 inches at maturity, it is a relatively small scorpion. Scorpions are relatively inactive during the daylight hours. The majority of scorpion bites occur at night during warm summer months. The most effective way to prevent scorpion bites is to avoid conducting work at night, visually inspect work areas prior to activities, and protect hands and legs by wearing the proper PPE.

Symptoms Scorpion stings can cause immediate local pain with minimal swelling. Numbness and tingling are frequently reported. The injured area may be hypersensitive to touch, pressure, heat, and cold. Small children are at highest risk, as demonstrated by “roving eye” symptoms and hyperactivity.

Treatment Most scorpion stings can be treated in the field. Clean the bitten area with soap and press a cool compress on the sting. Elevate the stricken limb to the approximate heart level. Take an analgesic to relieve minor pain, as needed. If symptoms are severe, seek immediate medical assistance at an emergency room or urgent care facility.

6.2.9 Venomous Arthropods

Many of the organisms in the phylum Arthropoda can produce venomous bites. The black widow and brown recluse spiders are included in the phylum.

Black Widow Spider

Physical Description The adult female is glossy black with short, almost microscopic hairs. Most female black widow spiders have a crimson hourglass marking on the underside of the abdomen. The spider reaches an overall length of 1 1/2 inches.

Habitat The female spider is found with her web and egg sacs in protected places such as vacant rodent burrows and under stones, logs, long grass, hollow stumps, and brush piles. They are also found in dark corners of barns, stables, garages, and piles of boxes and crates.

Symptoms After the bite, a dull, numbing pain in the affected extremity occurs. Also, pain and some muscular rigidity in the abdomen, back, and chest occur. The bite may also produce pain on inspiration (inhalation), headache, dizziness, skin rash, nausea, vomiting, anxiety, and weakness. Increased skin temperature over the affected area may be observed.

Treatment Ice may be placed over the bite to reduce the pain. Seek immediate medical attention.

Brown Recluse Spider

Physical Description The brown recluse is a spider of medium size (body 10 to 15 mm in length). It is brown in color, and the legs are long and lack unpaired claws.

Habitat This spider is found outdoors under rocks and rubble.

Symptoms After the bite, some localized pain develops within an hour. The bite area becomes swollen and skin temperature increases. The lesion has the appearance of a bull's eye and often becomes larger, ruptures, and leaves an ulcer that may involve underlying tissues, including muscle. Systemic symptoms and signs may develop, including nausea and vomiting.

Treatment. Ice may be placed over the bite to reduce the pain. Seek immediate medical attention.

6.2.10 Environmental Controls

Where required by LHAAP's Stormwater Pollution Prevention Plan, erosion control measures will be employed as determined by the field manager. Erosion controls measures may include, but are not limited to hay bales, silt fence, geo-textiles, etc. Once established, these structures must be inspected weekly and the inspection documented. Storage of IDW will comply with LHAAP's requirements (i.e., secondary containment), as applicable.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 PPE

The purpose of PPE is to provide a barrier, which will shield or isolate individuals from the chemical and/or physical hazards that may be encountered during work activities. S3NA-208-PR PPE Program lists the general requirements for selection and usage of PPE. Table 7-1 lists the minimum PPE required during site operations and additional PPE that may be necessary. The specific PPE requirements for each work task are specified in the individual AHAs found in Attachment A.

By signing this HASP you are agreeing that you have been properly trained in the use, limitations, care and maintenance of the protective equipment you will use at this project. If you have not received training on the proper use, care, and, limitations of the PPE required for this project. Contact the PM or SSHO for the proper training prior to signing this HASP.

Table 7-1: Personal Protective Equipment

TYPE	MATERIAL	ADDITIONAL INFORMATION
Minimum PPE		
Safety Vest	ANSI Type II high-visibility	Must have reflective tape/be visible from all sides
Boots	Leather	ANSI approved safety toe
Safety Glasses		ANSI Approved; ≥98% UV protection
Hard Hat		ANSI Approved; recommended wide-brim
Work Uniform		No shorts/cutoff jeans or sleeveless shirts
Additional PPE		
Hearing Protection	Ear plugs and/ or muffs	In hazardous noise areas (Noise Reduction Rating of 26 or higher)
Leather Gloves		If working with sharp objects or powered equipment
Protective Chemical Gloves	Nitrile rubber	
Level C Respiratory Protection	Mine Safety Association (full face mask or equivalent) equipped with GMA/P100 (Combination Organic Vapor and P/100)	Cartridge change out schedule is at the end of each shift (no more than eight hours)
Sunscreen	SPF 30 or higher	

7.2 RESPIRATORY PROTECTION

Respiratory protection, as described below, is required if airborne dust levels in the workers' breathing zone, as measured on the mini-RAM or equivalent dust monitoring method, are sustained above the action limit in Table 7-2:

Table 7-2: Respiratory Protection (Shaker and Remedial Activities)

TASK	ACTION LIMIT	RESPIRATORY PROTECTION
Excavation and tasks producing noticeable airborne dust	5 mg/m^3 for 15 minutes on the mini-RAM	Full Face respirator with (Magenta) HEPA cartridges and Organic Vapor Cartridges

Respiratory protection should also be donned if significant visible airborne dust is being produced during any operations.

All employees who are expected to don respiratory protection must have successfully passed a qualitative or quantitative fit-test within the past year for the brand, model and size respirator. Employees must be clean shaven, must have been trained in respiratory protection, and must have passed their annual medical exam in order to wear a respirator.

7.3 PPE DOFFING AND DONNING INFORMATION

The following information is to provide field personnel with helpful hints that, when applied, make donning and doffing of PPE a more safe and manageable task:

- Never cut disposable booties from your feet with basic utility knives. This has resulted in workers cutting through the booty and the underlying sturdy leather work boot, resulting in significant cuts to the legs/ankles. Recommend using a pair of scissors or a package/letter opener (cut above and parallel with the work boot) to start a cut in the edge of the booty, then proceed by manually tearing the material down to the sole of the booty for easy removal.
- When applying duct tape to PPE interfaces (wrist, lower leg, around respirator, etc.) and zippers, leave approximately one inch at the end of the tape to fold over onto itself. This will make it much easier to remove the tape by providing a small handle to grab while still wearing gloves. Without this fold, trying to pull up the tape end with multiple gloves on may be difficult and result in premature tearing of the PPE.
- Have a "buddy" check your ensemble to ensure proper donning before entering controlled work areas. Without mirrors, the most obvious discrepancies can go unnoticed and may result in a potential exposure situation.
- Never perform personal decontamination with a pressure washer.

7.4 DECONTAMINATION

7.4.1 General Requirements

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials, etc).

All personal decontamination activities shall be performed with an attendant ("buddy") to provide assistance to personnel that are performing decontamination activities. Depending on specific site hazards, attendants may be required to wear a level of protection that is equal to the required level in the EZ.

All persons and equipment entering the EZ shall be considered contaminated, and thus, must be properly decontaminated prior to entering the Support Zone (SZ).

Decontamination procedures may vary based on site conditions and nature of the contaminant(s). If chemicals or decontamination solutions are used, care should be taken to minimize reactions between the solutions and contaminated materials. In addition, personnel must assess the potential exposures created by the decontamination chemical(s) or solutions. The applicable SDS must be reviewed, implemented, and filed by personnel contacting the chemicals/solutions.

All contaminated PPE and decontamination materials shall be contained, stored and disposed of in accordance with site-specific requirements determined by site management.

7.4.2 Decontamination Equipment

The equipment required to perform decontamination may vary based on site-specific conditions and the nature of the contaminant(s). The following equipment is commonly used for decontamination purposes:

- Soft-bristle scrub brushes or long-handled brushes to remove contaminants;
- Hoses, buckets of water or garden sprayers for rinsing;
- Large plastic/galvanized wash tubs or children's wading pools for washing and rinsing solutions;
- Large plastic garbage cans or similar containers lined with plastic bags for the storage of contaminated clothing and equipment;
- Metal or plastic cans or drums for the temporary storage of contaminated liquids; and
- Paper or cloth towels for drying protective clothing and equipment.

7.4.3 Personal/Equipment Decontamination

All equipment leaving the EZ shall be considered contaminated and must be properly decontaminated to minimize the potential for exposure and off-site migration of impacted materials. Such equipment may include, but is not limited to: sampling tools, heavy equipment, vehicles, PPE, support devices (e.g., hoses, cylinders, etc.), and various handheld tools.

All employees performing equipment decontamination shall wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE may be equivalent to the level of PPE required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors. Following equipment decontamination, employees may be required to follow the proper personal decontamination procedures above.

For larger equipment, a high-pressure washer may need to be used. Some contaminants require the use of a detergent or chemical solution and scrub brushes to ensure proper decontamination.

For smaller equipment, use the following steps for decontamination:

1. Remove majority of visible gross contamination in EZ.
2. Wash equipment in decontamination solution with a scrub brush and/or power wash heavy equipment.
3. Rinse equipment.
4. Visually inspect for remaining contamination.
5. Follow appropriate personal decontamination steps outlined above.

All decontaminated equipment shall be visually inspected for contamination prior to leaving the Contaminant Reduction Zone (CRZ). Signs of visible contamination may include an oily sheen, residue or contaminated soils left on the equipment. All equipment with visible signs of contamination shall be discarded or re-decontaminated until clean. Depending on the nature of the contaminant, equipment may have to be analyzed using a wipe method or other means.

8.0 SITE CONTROL

8.1 GENERAL

The purpose of site control is to minimize potential contamination of workers, protect the public from site hazards, and prevent vandalism. The degree of site control necessary depends on the site characteristics, site size, and the surrounding community.

Controlled work areas will be established at each work location, and if required, will be established directly prior to the work being conducted. Diagrams designating specific controlled work areas will be drawn on-site maps, posted in the support vehicle or trailer and discussed during the daily safety meetings. If the site layout changes, the new areas and their potential hazards will be discussed immediately after the changes are made. General examples of zone layouts have been developed for drilling and earth moving activities (e.g., excavating, trenching, etc.) and are attached to this section.

8.2 CONTROLLED WORK AREAS

Each HAZWOPER controlled work area will consist of the following three zones:

- EZ: Contaminated work area
- CRZ: Decontamination area
- SZ: Uncontaminated or "clean area" where personnel should not be exposed to hazardous conditions

Each zone will be periodically monitored in accordance with the air monitoring requirements established in this HASP. The EZ and the CRZ are considered work areas. The SZ is accessible to the public (e.g., vendors, inspectors).

8.2.1 EZ

The EZ is the area where primary activities occur, such as sampling, remediation operations, installation of wells, cleanup work, etc. This area must be clearly marked with hazard tape, barricades or cones, or enclosed by fences or ropes. Only personnel involved in work activities, and meeting the requirements specified in the applicable THA/JSA and Sections 4.1 and 4.2 will be allowed in an EZ.

The extent of each area will be sufficient to ensure that personnel located at/beyond its boundaries will not be affected in any substantial way by hazards associated with sample collection activities. To meet this requirement, the following minimum distances will be used:

- **Direct Push Drilling and Excavation Activities**. A distance of 20 feet in all directions will be cleared from the rig.
- **Well development**. A distance of 20 feet in all directions from the boring location will be cleared to accommodate equipment and personnel.
- **Groundwater Sampling**. A distance of 10 feet will be cleared in all directions from the sampling location in order to accommodate additional sampling equipment.

All personnel should be alert to prevent unauthorized, accidental entrance into controlled-access areas (the EZ and CRZ). If such an entry should occur, the trespasser should be immediately escorted outside the area, or all HAZWOPER-related work must cease. All personnel, equipment, and supplies that enter controlled-access areas must be decontaminated or containerized as waste prior to leaving (through the CRZ only).

8.2.2 CRZ

The CRZ is the transition area between the contaminated area and the clean area. Decontamination is the main focus in this area. The decontamination of workers and equipment limits the physical transfer of hazardous substances into the clean area. This area must also be clearly marked with hazard tape and access limited to personnel involved in decontamination. Decontamination procedures are further explained in Section 7.4.

8.2.3 SZ

The SZ is an uncontaminated zone where administrative and other support functions, such as first aid, equipment supply, emergency information, etc., are located. The SZ shall have minimal potential for significant exposure to contaminants (i.e., background levels).

Employees will establish a SZ (if necessary) at the site before the commencement of site activities. The SZ would also serve as the entry point for controlling site access.

8.3 SITE ACCESS DOCUMENTATION

If implemented by the PM, all personnel entering the site shall complete the "Site Entry/Exit Log" located at the site trailer or primary site support vehicle.

8.3.1 Visitor Access

Visitors to any HAZWOPER controlled-work area must comply with the health and safety requirements of this HASP or of the HASP designated by the U.S. Army, and demonstrate an acceptable need for entry into the work area. All visitors desiring to enter any controlled work area must observe the following procedures:

1. A written confirmation must be received by AECOM documenting that each of the visitors has received the proper training and medical monitoring required by this HASP, as applicable. Verbal confirmation can be considered acceptable provided such confirmation is made by an officer or other authorized representative of the visitor's organization.
2. Each visitor will be briefed on the hazards associated with the site activities being performed and acknowledge receipt of this briefing by signing the appropriate tailgate safety briefing form.
3. All visitors must be escorted by an AECOM or U.S. Army designated employee.

If the site visitor requires entry to any EZ, but does not comply with the above requirements, all work activities within the EZ must be suspended. Until these requirements have been met, entry will not be permitted.

8.4 SITE SECURITY

Site security is necessary to:

- Prevent the exposure of unauthorized, unprotected people to site hazards
- Avoid the increased hazards from vandals or persons seeking to abandon other wastes on the site
- Prevent theft
- Avoid interference with safe working procedures

To maintain site security during working hours:

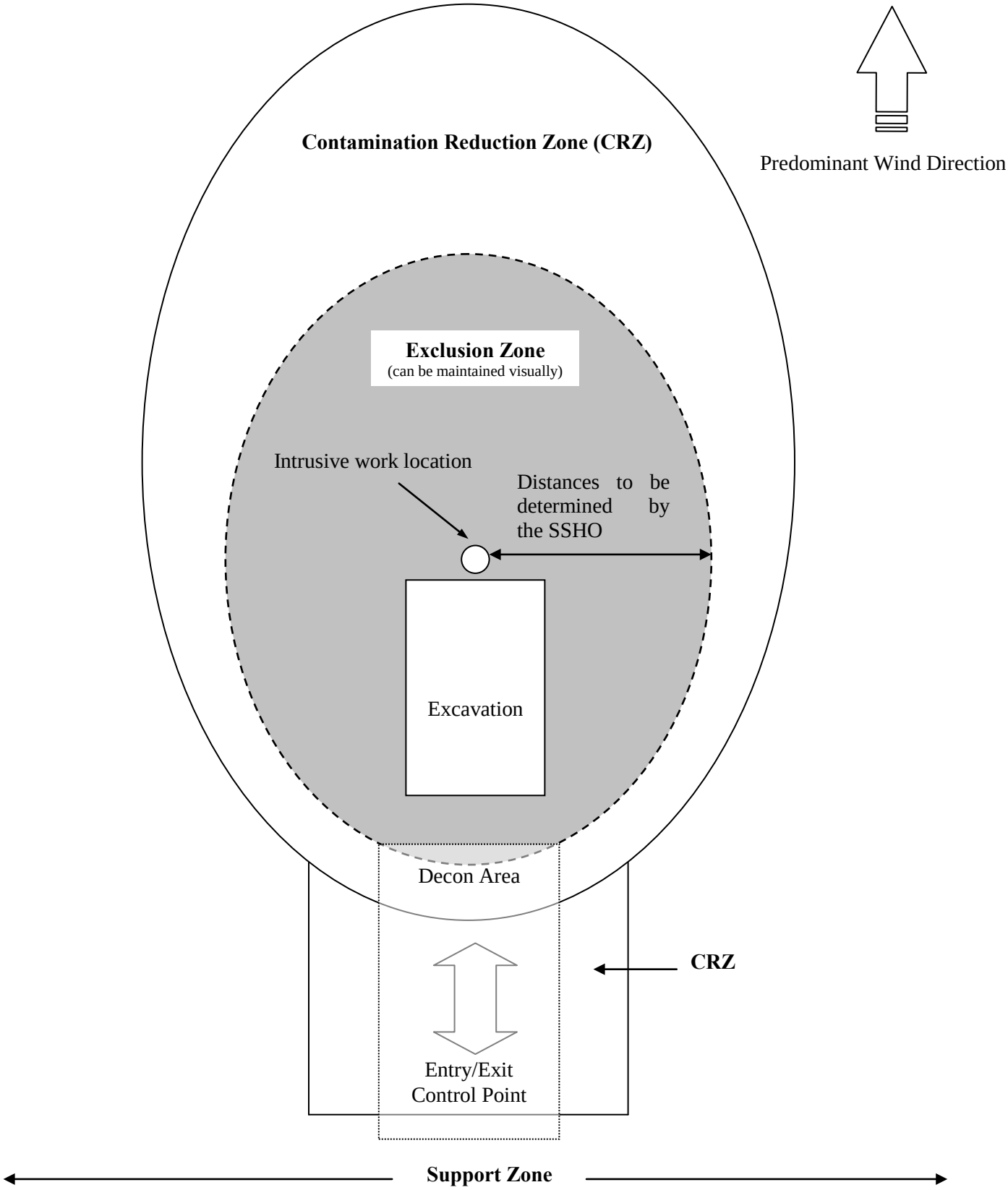
1. Maintain security in the SZ and at access control points.
2. Establish an identification system to identify authorized persons and limitations to their approved activities.
3. Assign responsibility for enforcing authority for entry and exit requirements.
4. When feasible, install fencing or other physical barrier around the site.
5. If the site is not fenced, post signs around the perimeter and whenever possible, use guards to patrol the perimeter. Guards must be fully apprised of the hazards involved and trained in emergency procedures.
6. Have the PM or Site Supervisor approve all visitors to the site. Make sure they have valid purpose for entering the site. Have trained site personnel accompany visitors at all times and provide them with the appropriate protective equipment.

To maintain site security during off-duty hours:

1. If possible, assign trained, in-house technicians for site surveillance. They will be familiar with the site, the nature of the work, the site's hazards, and respiratory protection techniques.

2. If necessary, use security guards to patrol the site boundary. Such personnel may be less expensive than trained technicians, but will be more difficult to train in safety procedures and will be less confident in reacting to problems around hazardous substances.
3. Enlist public enforcement agencies, such as the local police department, if the site presents a significant risk to local health and safety.
4. Secure the equipment.

Figure 8-1: Excavation Site Control Layout



9.0 EMERGENCY RESPONSE PLANNING

9.1 EMERGENCY ACTION PLAN

Although the potential for an emergency to occur is remote, an emergency action plan has been prepared in accordance with S3NA-603-PR Emergency Response Planning, Field for this project should such critical situations arise. The only significant type of onsite emergency that may occur is physical injury or illness to a member of the AECOM team. The Emergency Action Plan (EAP) will be reviewed by all personnel prior to the start of field activities. A test of the EAP will be performed within the first three days of the project field operations. This test will be evaluated and documented in the project records.

Three major categories of emergencies could occur during site operations:

1. Illnesses and physical injuries (including injury-causing chemical exposure)
2. Catastrophic events (fire, explosion, earthquake, or chemical)
3. Safety equipment problems

9.1.1 Emergency Coordinator

The duties of the emergency coordinator include:

- Implement the EAP based on the identified emergency condition
- Notify the appropriate project and SH&E Department personnel of the emergency (Table 9-3)
- Verify emergency evacuation routes and muster points are accessible
- Conduct routine EAP drills and evaluate compliance with the EAP

9.1.2 Site-Specific Emergency Procedures

Prior to the start of site operations, the emergency coordinator will complete Table 9-1 with any site-specific information regarding evacuations, muster points, communication, and other site-specific emergency procedures.

Table 9-1: Emergency Planning

Emergency	Evacuation Route	Muster Location
Chemical Spill	• Upwind [**minimum 100 feet**]	• TBD
Fire/Explosion	• Shortest distance away from incident	• TBD
Tornado	• Nearest strong structure	• TBD
Lightning	• Shortest route	• Vehicle
Equipment Malfunction	• Shortest distance away from the equip.	• N/A
Additional Information		
Communication Procedures	Cell phone, voice/visual	
CPR/First Aid Trained Personnel	SSHO	
Site-Specific Spill Response Procedures	Spill kits will be available at the site; SSHO will contact as required	

9.1.3 Spill Containment Procedure

Work activities may involve the use of hazardous materials (i.e., fuels, solvents) or work involving drums or other containers. Where these activities exist, a Site-Specific Spill Reporting Card will be developed (Attachment D). Procedures in S3NA-520-PR Spill Response, Incidental as well as those outlined below will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers
- Tops/lids will be placed back on containers after use
- Containers of hazardous materials will be stored appropriately away from moving equipment

At least one spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material (i.e. speedy dri) shall be available at each work site (more as needed).

- All hazardous commodities in use (i.e., fuels) shall be properly labeled
- Containers shall only be lifted using equipment specifically manufactured for that purpose
- For drums/containers, follow the procedures in S3NA-308-PR, Manual Lifting, Field, to minimize spillage

9.1.4 Safety Accident/Incident Reporting

All accidents and incidents that occur on-site during any field activity will be promptly reported to the SSHO and the immediate supervisor in accordance with S3NA-004-PR Incident Reporting.

If any AECOM employee is injured and requires medical treatment, the Site Supervisor will contact the **Regional Safety Manager, AECOM's Incident Reporting Line at (800) 348-5046, and the applicable Account Manager immediately**. The Site Supervisor will initiate a written report, using the ***Supervisor's Report of Incident*** form (see SH&E 004-PR). The Site Supervisor will complete the first two sections of this form and forward to the PM for completion of Section 3. The report will then be provided to the SH&E Professional before the end of the following shift.

If any employee of a subcontractor is injured, documentation of the incident will be accomplished in accordance with the subcontractor's procedures; however, copies of all documentation (which at a minimum must include the OSHA Form 301 or equivalent) must be provided to the SSHO within 24 hours after the accident has occurred.

All accidents/incidents will be investigated in accordance with S3NA-603-PR, Incident Investigation and Review. Copies of all subcontractor accident investigations, whether accomplished in accordance with their own procedures or S3NA-603, will be provided to the SSHO within five days of the accident/incident.

9.1.5 Environmental Spill/Release Reporting

All environmental spills or releases of hazardous materials (e.g., fuels, solvents, etc.), whether in excess of the Reportable Quantity or not, will be reported according to the sequence identified in the *Site-Specific Spill Reporting Card*. In determining whether a spill or release must be reported to a regulatory agency, the Site Supervisor will assess the quantity of the spill or release and evaluate the reporting criteria against the state-specific reporting requirements, your applicable regulatory permit, and/or client-specific reporting procedures. In order to support the Site Supervisor and expedite the decision to report to a state regulatory agency, a Site-Specific Spill Reporting Card will be developed (Attachment D). **If reporting to a state or Federal regulatory agency is required, AECOM has 15 minutes from the time of the spill/release to officially report it. Coordinate with client first.**

Chemical-specific CERCLA Reportable Quantities for the known chemicals onsite are shown in Table 9-2.

Table 9-2: CERCLA Reportable Quantities

Hazardous Substance	Regulatory Synonyms	Final Reportable Quantity (pounds)
Benzene	N/A	10
Toluene	N/A	1,000
Ethyl Benzene	N/A	1,000
Xylene	N/A	100
Mercury	N/A	1
Lead	N/A	10
Arsenic	N/A	1
Chromium	N/A	5,000
Nickel	N/A	100
Cadmium	N/A	10
Selenium	N/A	100
Trichloroethylene	Trichloroethene, TCE	100
Tetrachloroethylene	Perchloroethylene, PCE	100
Carbon Tetrachloride	N/A	10
Methyl Ethyl Ketone	MEK	5,000
1,1,1-Trichloroethane	TCA	1,000

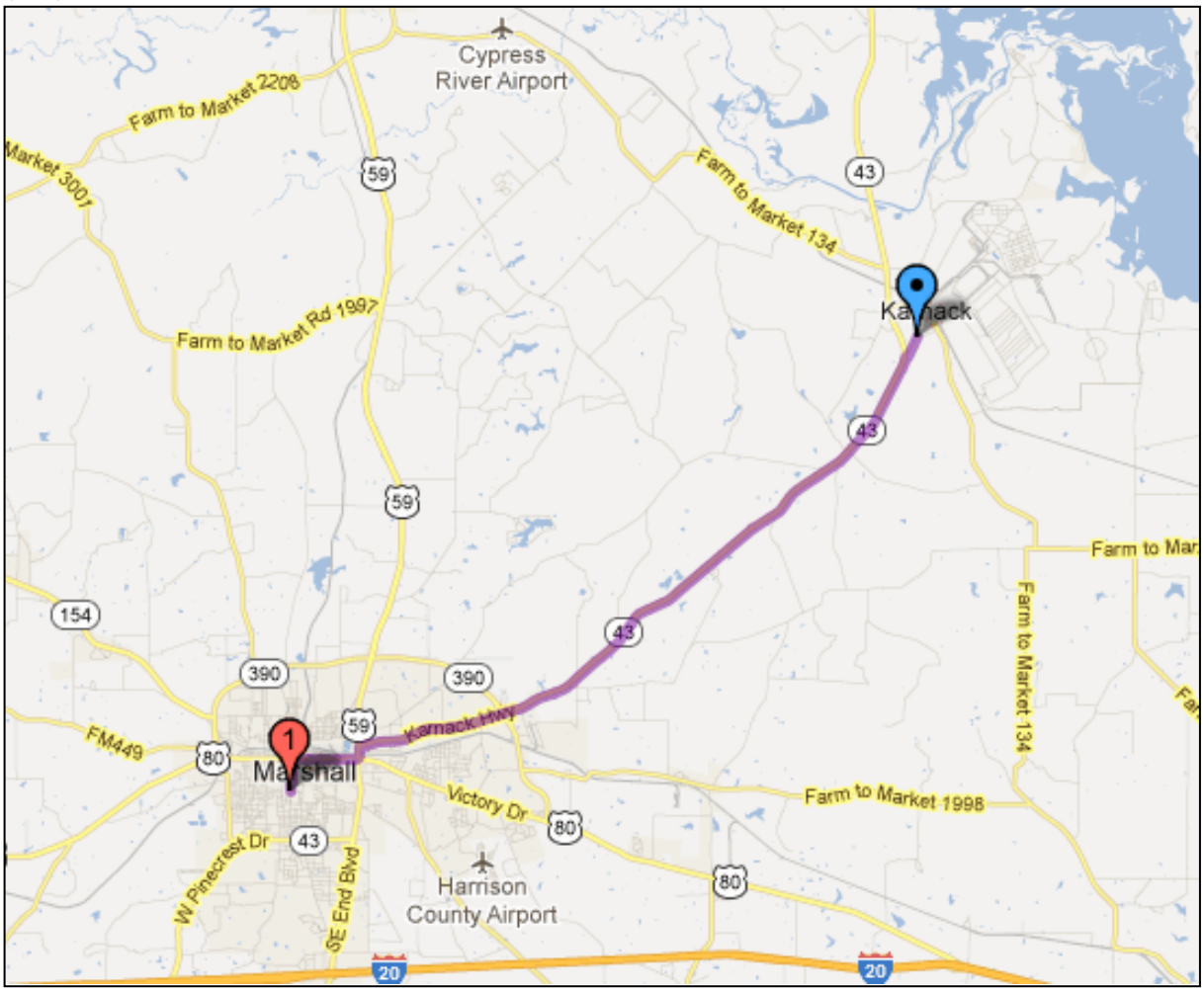
CERCLA Reportable Quantities can be found at: http://www.epa.gov/oem/docs/er/302table01.pdf

Table 9-3: Emergency Contacts

Name	Title/Workstation	Telephone Number	Mobile Phone
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	LHAAP Site Manager	(479) 635-0110	
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor/Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	Regional SH&E Manager	(312) 373-7813	(312) 593-8489
Incident Reporting	**Incident Reporting Line**	**(800) 348-5046**	
Eric Olson	DOT/IATA Shipping Expert	(864) 906-7309	(864) 297-3102
	U.S. Coast Guard	(804) 484-8192	
Organization / Agency			
Name			**Telephone Number**
LHAAP Police Department/Non Emergency			911 or (903) 935-4525
LHAAP Fire Department			911 or (903) 935-4580
State Police			911
Ambulance Service; ***(EMT will determine appropriate hospital for treatment)***			911
Non-Emergency Clinic ***(Use by site personnel is only for non-emergency cases)***			(903) 927-6240
Good Shepherd Occ Med Clinic Marshall			
614 S. Grove Street			
Marshall, Texas 75670			
Non-Emergency Clinic Route: See Figure 9-1; Hospital Route: See Figure 9-2			
WorkCare: 24-hr On-Call Occupational Nurse (*Non-Emergency assistance only,* ***call SH&E first***)			(800) 455-6155
Poison Control Center			(800) 222-1222
Pollution Emergency			(800) 292-4706
National Response Center			(800) 424-8802
Info-Trac: 24-hr Response Services– *Account # 74984*			(800) 535-5053
Tier II or SARA Title III Hot Line			(800) 424-9346
Public Utilities			
Name			**Telephone Number**
Common Ground Alliance Nationwide *Call Before You Dig*			811

Figure 9-1: Occupational Medicine Clinic Route/Detail Map

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240



From: Hwy 449
Karnack, TX

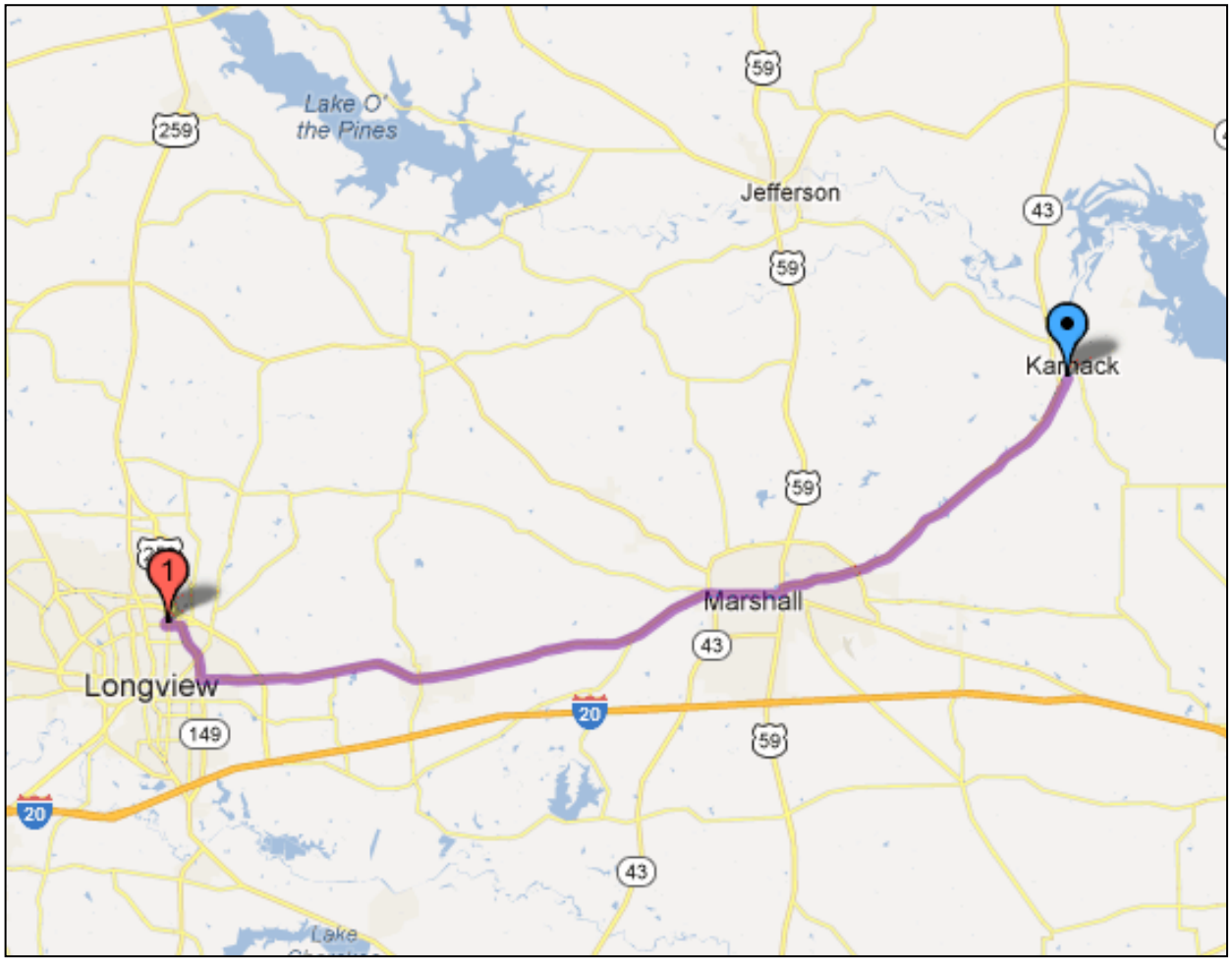
To: 614 S Grove St
Marshall, TX 75670

1. 0.4 mi, Head **southwest** on **TX-449 Spur S/T J Taylor Ave** toward **Co Rd 2601/Jay St**
2. 207 ft, Take the 1st **right** to stay on **TX-449 Spur S/T J Taylor Ave**
3. 12.9 mi, Turn **left** onto **TX-43 S**
4. 0.2 mi, Turn **left** onto **NE End Blvd**
5. 1.3 mi, Take the 2nd **right** onto **E Grand Ave**
6. 0.6 mi, Turn **left** onto **N Grove St**

15.4 mi, Estimated driving time: 22 minutes, destination will be on the left

Figure 9-2: Hospital Route Map

Longview Regional Medical Center
2901 North 4th Street
Longview, Texas 75605
(903) 758-1818



From: Hwy 449
Karnack, TX

To: 2901 N 4th St
Longview, TX 75605

1. 0.4 mi, Head **southwest** on **TX-449 Spur S/T J Taylor Ave** toward **Co Rd 2601/Jay St**
2. 207 ft, Take the 1st **right** to stay on **TX-449 Spur S/T J Taylor Ave**
3. 12.9 mi, Turn **left** onto **TX-43 S**
4. 0.2 mi, Turn **left** onto **NE End Blvd**
5. 21.8 mi, Take the 2nd **right** onto **US-80 W/E Grand Ave,** Continue to follow US-80 W
6. 2.1 mi, Turn **right** onto **N Eastman Rd**
7. 0.6 mi, Turn **left** onto **Hollybrook Dr**
8. 0.1 mi, Turn **right** onto **Medical Cir**
9. 479 ft, Turn **right**

38.3 mi, Estimated driving time: 48 minutes, destination will be on the right

10.0 PERSONNEL ACKNOWLEDGEMENT

By signing below, the undersigned acknowledges that he/she has read and reviewed the AECOM Health and Safety Plan for LHAAP at Karnack, Texas. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein.

PRINT NAME	SIGNATURE	ORGANIZATION	DATE

Attachment A: Activity Hazard Analysis

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Acidic/Caustic Material Handling		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing, inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Determine sampling locations to characterize soils	Slips/trips/falls, bio hzds	1	1	1	Low	Standard PPE ensemble; training
3	Ensure media, equipment, tools and supplies are readily available	Potential to break sample containers	2	1	2	Low	Standard PPE ensemble; training (lift criteria 49 lbs), eye wash station
4	Don appropriate PPE (after visual inspection)	Slips/trips/falls, bio hzds, splashes	3	3	9	Medium	Standard PPE ensemble; training, equipment
5	Position yourself adequately near acid/caustic material	Descrepancies, equipment failure	1	1	1	Low	Standard PPE ensemble; training
6	Visualize surroundings prior to starting task	Slips/trips/falls, manuel lifting, contact	1	1	1	Low	Standard PPE ensemble; training
7	Stand away from conveyance equipment while transferring chemical in	Slips/trips/falls,bio hzds,splash/spills	1	4	4	Low	Standard PPE ensemble; training, splashback of product
8	case of line rupture. Also, identify location of eye wash and ensure		2	2	4	Low	
9	that eye wash is operational prior to commencing liquid transfer.						
10	Transfer acid/caustic soda from container, check pressure lines are secure.	Slips/trips/falls,bio hzds,splash/spills	1	1	1	Low	Standard PPE ensemble; weight restrictions, additional personnel
11	Decontaminate conveyance tools (tubing and pump) & impervious supplies	Slips/trips/falls, bio hzds	1	1	1	Low	Standard PPE ensemble, training
12	after use and prior to disassembly.						
13	Dispose of task related waste, i.e., rinsate, Tyvek suit, leather/nitrile	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training
14	gloves, etc. (IDW).						
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

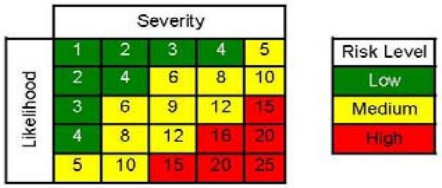
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Acidic/Caustic Material Handling	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses/Goggles/Face Shield/Apron
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☑ Nitrile gloves or butyl rubber gloves
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-305-PR Hand and Power Tools	S3NA-414-PR Railway Sites	
2 First Aid/CPR	S3NA-307-PR Housekeeping, Worksite	S3NA-507 PR Hazardous Materials Communication /	
3	S3NA-308-PR Manual Lifting, Field	S3NA-512-PR Laboratory Safety	
4	S3NA-312-PR Stairways and Ladders	S3NA-520-PR Spill Response, Incidental	
5 Dispose of task related waste, i.e., rinsate, Tyvek suit,	S3NA-410-PR Hazardous Energy Control		
6 leather/nitrile gloves, etc. (IDW).	S3NA(US)-413-PR Process Safety Management		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Acidic/Caustic Material Handling	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Acidifying Lab Samples		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing, inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Remove the cap from the sample container.	Slips/trips/falls, bio hzds	2	3	6	Medium	Standard PPE ensemble; training
3	Remove the glass stopper from the 50mL acid container.	Potential to break sample containers	3	4	12	Medium	Standard PPE ensemble; training, eye wash station
4	To prevent contamination, place the glass stopper, head first, on the bench	Slips/trips/falls, bio hzds, splashes	3	4	12	Medium	Standard PPE ensemble; training, equipment
5	Remove the pipet from its holder. The pipet will dispense up to	Descrepancies, equipment failure	3	4	12	Medium	Standard PPE ensemble; training, splashback of product
6	1 mL in volume. Compress and hold the rubber bulb. Immerse the tip	Slips/trips/falls, manuel lifting, contact					Standard PPE ensemble; training, splashback of product
7	of pipet into container below liquid surface and release bulb.	Slips/trips/falls,bio hzds,splash/spills					Standard PPE ensemble; training, splashback of product
8	Dispense the required amount of acid into the sample container and	Slips/trips/falls,bio hzds,splash/spills	3	4	2	Low	Standard PPE ensemble; training, splashback of product
9	close cap tightly.						
10	Replace the glass stopper onto the acid container and place the	Slips/trips/falls,bio hzds,splash/spills	3	4	12	Medium	Standard PPE ensemble; training, splashback of product
11	dropper into its holder.						
12	Invert the sample container several times to mix.	Slips/trips/falls,bio hzds,splash/spills	3	4	12	Medium	Standard PPE ensemble; training, splashback of product
13	(Do not do this if the container is empty).						
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

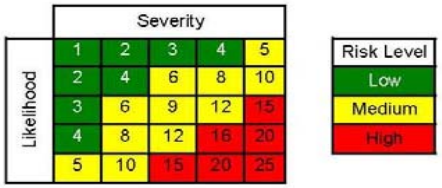
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
SUMMARY OF CONTROLS	Task Name: Acidifying Lab Samples		Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses/Goggles/Face Shield/Apron
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☑ Nitrile gloves or butyl rubber gloves
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-305-PR Hand and Power Tools	S3NA-507 PR Hazardous Materials Communica	
2 First Aid/CPR	S3NA-307-PR Housekeeping, Worksite	S3NA-512-PR Laboratory Safety	
3	S3NA-308-PR Manual Lifting, Field	S3NA-520-PR Spill Response, Incidental	
4	S3NA-312-PR Stairways and Ladders		
5	S3NA-410-PR Hazardous Energy Control		
6	S3NA(US)-413-PR Process Safety Management		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Acidifying Lab Samples	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies		Other Emergency Plan Details
☑ First Aid Kit - Type:	☑ Eye Wash	Good Shepherd Occ Med Clinic Marshall
☐ Blankets / Survival:	☐ Spill Kit	614 S. Grove Street
☐ Fire Extinguishers Type:	☐ Other:	Marshall, Texas 75670
☑ Communication Device		(903) 927-6240
☑ Vehicle Safety Equipment		

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Boating		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing, Inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Brief and follow local safety criteria for the site visiting	None	1	1	1	Low	Standard PPE ensemble; training
3	Ensure qualified operator is present to brief personnel	Individual does not understand	2	3	6	Medium	Standard PPE ensemble; training
4	Ensure safety equipment is present for all personnel	Slips,trips,falls,cuts,lifting	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
5	Don appropriate PPE (after visual inspection)	Slips, trips and falls, falling in lagoon	1	1	1	Low	Standard PPE ensemble; training, meters, equipment, PFD's
6	Ensure supplies are present	Frustration, time	1	1	1	Low	Standard PPE ensemble; training, meters, equipment, PFD's
7	Personnel on land to maintain visual contact/communication	Slips, trips and falls, falling in lagoon	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment, PFD's
8	Prior to leaving the loading dock/pier check load capability.	Frustration	3	3	9	Medium	Standard PPE ensemble; training, meters, equipment, PFD's
9	Ensure boat is never overloaded by individuals, equipment or supplies.	Splash and drowning	4	4	16	High	Standard PPE ensemble; training, meters, equipment, PFD's
10	Keep communications intact until tasking is complete.	Slow of emergency response	2	2	4	Low	Standard PPE ensemble; training, meters, equipment, PFD's
11	When tasking is complete ensure all materials are removed	Spillage, splashes, slips/trips/falls	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment, PFD's
12	from boat and stored properly.	Splashes, slips/trips/falls			0		
13	a. Do not extend body too far over the side	Slips/trips/fall, bio haz	4	4	16	High	Standard PPE ensemble; training, meters, equipment, PFD's
14	b. Bottom of boat may be slippery	Breakage of container	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment, PFD's
15	Return to shore and unload boat	Splash and drowning	3	3	9	Medium	Standard PPE ensemble; training, meters, equipment, PFD's
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level: Low, Medium, High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS

Task Name: Boating

Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves/Nitrile Gloves
- ☑ Hearing Protection
- ☑ Personal Flotation Device (PFD)
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-307-PR Housekeeping, Worksite	S3NA-511-PR Heat Stress Prevention	HAZWOPER
2 Boating Safety Awareness	S3NA-308-PR Manual Lifting, Field	S3NA-516-PR Radiation Safety Programs	
3	S3NA-305-PR Hand and Power Tools	S3NA-520-PR Spill Response, Incidental	
4	S3NA-419-PR Water, Marine Operations_Boating		
5	S3NA-507 PR Hazardous Materials Communication		
6	S3NA-509-PR Hazardous Waste Operations and En		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Boating	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Clearing and Grubbing		Regularity of Task: One-time ☑ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Inspect equipment	None	1	1	1	Low	
2	Go over equipment safety cards		1	1	1	Low	
3	Review work plan of area to be cleared		1	1	1	Low	
4	Put on PPE.		2	2	4	Low	For Chainsaw must have chainsaw chaps
5	Plan for where limbs and trees are going to fall (if cutting trees)	Falling trees, chainsaw	2	2	4	Low	Provide verbal warning before falling limbs or tree.
6	Start saw and make cut		3	3	9	Medium	
7	Shut off saw when finished		2	2	4	Low	
8	Put saw up.		1	1	1	Low	
9	Set up wood chipper if using		1	1	1	Low	Ensure clothing is relatively tight, give verbal warnings, clear to 25 feet
10	Inspect the wood chipper.		1	1	1	Low	
11	Close all doors and access panels before starting unit.	Flying debris	1	1	1	Low	
12	Start unit and feed in the limbs.		2	2	4	Low	
13	Shut down chipper when finished.		2	2	4	Low	Ensure clothing is relatively tight, give verbal warnings, clear to 25 feet
14	Move to new location and repeat steps as needed.				0		
15					0		
16					0		
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Clearing and Grubbing	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☐ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☐ Leather Glover
- ☐ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-305-PR Hand and Power Tools		
2	S3NA-411-PR Machine Guarding		
3	S3NA-514-PR Munitions and Explosives of Concern		
4			
5			
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Clearing and Grubbing	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Direct Push Drilling Operations		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Inspection of equipment (Inspection checklist)	Slips,trips,falls,cuts,lifting,pinch points	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
3	Correct any identified deficiencies from inspection	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training
4	Verify subsurface utility clearances were completed	None	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
5	Position rig over intended drilling/sampling location	Slips,trips,falls,cuts,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
6	Ensure that all push rods are racked	Unsecure rods could fall	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
7	Initiate direct push sampling or activities	H2S, Oxygen, CO, LEL, PID	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
8	Remove rods and rack them upon removal	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
9	Decontaminate rods	Splashing of contaminants	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
10	Collect rinsate	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
11	Wipe off rods and dispose of non-IDW trash	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
12	Daily housekeeping around the site	Slips,trips,falls,cuts,lifting	2	2	4	Low	Standard PPE ensemble
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

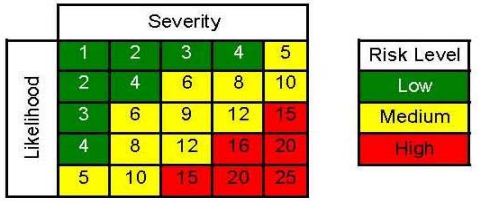
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
SUMMARY OF CONTROLS	Task Name: Direct Push Drilling Operations		Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves/Nitrile Sampling Gloves
- ☑ Hearing Protection
- ☑ Fall Protection(if greater than 6' above ground surface)
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
H2S	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-307-PR Housekeeping, Worksite	S3NA-417-PR Utilities, Underground	Qualified equipment operators (rig operator)
2 Equipment specific training	S3NA-308-PR Manual Lifting, Field	S3NA-508-PR Hazardous Materials Handling ar	DOT Level I Shipping
3 Biological Hazards	S3NA-309-PR Mobile or Heavy Equipment	S3NA-517-PR Radiation, Non-Ionizing	
4	S3NA-405-PR Drilling and Boring	S3NA-520-PR Spill Response, Incidental	
5	S3NA-406-PR Electrical Lines, Overhead		
6	S3NA-414-PR Railway Sites		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Direct Push Drilling Operations	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Excavation/Trenching and Removal of Surface Contamination		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Conduct tailgate safety meeting.	Slips, trips, and falls.	1	2	2	Low	Standard PPE ensemble; training
2	Verify locations/anomalies for excavation/removal	Excavation collapse/cave in	2	2	4	Low	Standard PPE ensemble; training
3	Verify subsurface utility clearances	None	1	2	2	Low	Standard PPE ensemble; training
4	Conduct pre-op inspection of equipment	Slips,trips,falls,cuts,lifting,pinch points	3	3	9	Medium	Standard PPE ensemble; training, equipment
5	Correct any deficiencies identified in the inspection	Slips,trips,falls,cuts,lifting,pinch points	3	3	9	Medium	Standard PPE ensemble; training, equipment
6	Inspect PPE	None	1	1	1	Low	Standard PPE ensemble; training
7	Don appropriate PPE	None	1	1	1	Low	Standard PPE ensemble; training
8	Commence excavation or removal operations	Slips,trips,falls, biological, noise, cuts	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
9	Establish spotter for excavation/removal operations	Slips,trips,falls, biological, noise, cuts	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
10	Conduct air monitoring if not using wet methods	Oxygen, Hydrocarbons, VOCs, LEL, PID	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
11	Evaluate air monitoring results/act accordingly	Oxygen, Hydrocarbons, VOCs, LEL, PID	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
12	Remove contaminated soil/stage for disposal	Slips,trips,falls, biological, noise, cuts	2	2	4	Low	Standard PPE ensemble; training, equipment
13	Properly stage for disposal all IDW, proper facility	None	1	1	1	Low	Standard PPE ensemble; training
14	Obtain load tickets and bill of lading	None	1	1	1	Low	Standard PPE ensemble; training
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

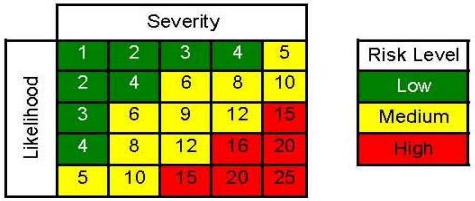
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS

Task Name: Excavation/Trenching and Removal of Surface Contamination

Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection (where required)
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Aerosols	BZ & EZ, 30 min	>05-10 mg/m^3 or >5.0@EZ	Upgrade to Level C, Implement dust suppression measures; contact the SSO & SP

Required Training (associated with this THA)

1. Field Safety
2. General Excavation Safety
3. Trench/Excavation Safety
4. Hearing Protection
5. Biological Hazards
6. First Aid/CPR

Key SOPs (associated with this THA)

- S3NA-303-PR Excavation and Trenching
- S3NA-309-PR Mobile or Heavy Equipment
- S3NA-307-PR Housekeeping, Worksite
- S3NA-312-PR Stairways and Ladders
- S3NA-406-PR Electrical Lines, Overhead
- S3NA-417-PR Utilities, Underground
- S3NA-510-PR Hearing Conservation Program
- S3NA-511-PR Heat Stress Prevention
- S3NA-517-PR Radiation, Non-Ionizing

Client & Other Requirements

Subcontractor is to provide the OSHA Competent Person for Excavation and provide proper documentation to AECOM prior to start of site work. Daily inspection form to be completed by Competent Person as well.

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Excavation/Trenching and Removal of Surface Contamination	Regularity of Task: One-time ☑	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
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Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
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Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: General Site Cleanup	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Conduct tailgate safety meeting.	None	1	1	1	Low	Standard PPE ensemble; training
2	Don PPE	None	1	1	1	Low	Standard PPE ensemble; training
3	Begin cleanup before sunset	Slips, trips, and falls, bio hazards	2	3	6	Medium	Standard PPE ensemble; training
4	Police entire work area	Slips, trips, and falls, bio hazards	2	3	6	Medium	Standard PPE ensemble; training, equipment
5	If conditions were windy, police adjacent areas	Slips, trips, and falls, bio hazards	2	2	4	Low	Standard PPE ensemble; training, equipment
6	Secure debris w/tarps etc. prior to transport	Property damage	1	1	1	Low	Standard PPE ensemble; training
7							
8							
9							
10							
11							
12							
13							
14							
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

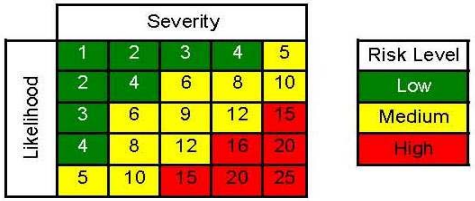
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: General Site Cleanup	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection (where required)
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Field Safety	S3NA-307-PR Housekeeping, Worksite		
2 Trench/Excavation Safety	S3NA-312-PR Stairways and Ladders		
3 Hearing Protection	S3NA-505-PR Cold Stress Prevention		
4 Biological Hazards	S3NA-511-PR Heat Stress Prevention		
5 First Aid/CPR	S3NA-517-PR Radiation, Non-Ionizing		
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: General Site Cleanup	Regularity of Task: One-time ☑	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
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Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Ground Water Level Static Checks		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification (*before controls*) Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing	None	1	1	1	Low	Standard PPE ensemble; training
2	Prepare equipment/monitors, paper work, log books	None	2	1	2	Low	Standard PPE ensemble; training, meters, equipment
3	Inspect PPE/Don PPE/look for critters	Slips/trips/falls, bio hzds	1	1	1	Low	Standard PPE ensemble; training
4	Open well head and allow to ventilate for 15 minutes	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
5	Measure/evaluate %LEL and VOCs at well head	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
6	Record readings in log book	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
7	Insert groundwater measuring device	H2S, Oxygen, CO, LEL, PID	3	2	6	Medium	Standard PPE ensemble; training, equipment
8	Record readings in log book	H2S, Oxygen, CO, LEL, PID	3	3	9	Medium	Standard PPE ensemble; training, equipment
9	Clean off equipment and retain garbage for disposal	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment
10	Clean area if required	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment
11	Close well head and secure	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment
12	Decontaminate any equipment or materials	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment
13	Move to next sample location, repeat step	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment
14	End of day housekeeping	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level: Low, Medium, High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS

Task Name: Ground Water Level Static Checks

Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☑ Nitrile Gloves for Handling Instruments/Sampling
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
H2S	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)	
1 Tool specific training	S3NA-308-PR Manual Lifting, Field	
2 Equipment Specific	S3NA-405-PR Drilling and Boring	
3	S3NA-307-PR Housekeeping, Worksite	
4	S3NA-417-PR Utilities, Underground	
5	S3NA-520-PR Spill Response, Incidental	
6		

Client & Other Requirements

Any well which has been sealed for longer than 6 hours will be allowed to ventilate for a minimum of 5 minutes upon opening, then monitored for VOC concentration using a PID. A reading in excess of 100 ppm will require additional ventilation, followed by re-monitoring. If an acceptable VOC concentration cannot be reached within 30 minutes of opening a well, reseal it and contact the Safety Professional (SP) for guidance.

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Ground Water Level Static Checks	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)		
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies		Other Emergency Plan Details
☑ First Aid Kit - Type:	☐ Eye Wash	Good Shepherd Occ Med Clinic Marshall
☐ Blankets / Survival:	☐ Spill Kit	614 S. Grove Street
☐ Fire Extinguishers Type:	☐ Other:	Marshall, Texas 75670
☑ Communication Device		(903) 927-6240
☑ Vehicle Safety Equipment		

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Groundwater Sampling	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing	None	1	1	1	Low	Standard PPE ensemble; training
2	Prepare sample containers	Potential to break sample containers	2	1	2	Low	Standard PPE ensemble; training
3	Drive to well site (observe steps 4 thru	Driving hazards	1	1	1	Low	Standard PPE ensemble; training
4	Open well head and allow to ventilate for 15 minutes	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment, training
5	Measure/evaluate %LEL and VOCs at well head	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment, training
6	Install temporary pump or peristaltic pump tubing	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment, training
7	Purge required volume of groundwater	Slips/trips/falls, bio hzds	3	2	6	Medium	Standard PPE ensemble; training, equipment, training
8	Containerize purge water in 5 gallon bucket with lid	Slips/trips/falls, bio hzds	3	3	9	Medium	Standard PPE ensemble; training, equipment, training
9	Collect groundwater samples	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
10	Place samples in iced cooler for transportation to lab	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
11	Complete documentation	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
12	Remove temporary pump installation or tubing	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
13	Decontaminate temporary pump	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
14	Place lid securely on 5 gallon bucket of purge water	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
15	Inspect drums for integrity prior to transferring purge water	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
16	Move purge water to purge water drum residing atop a pallet	Slips/trips/falls, bio hzds	3	3	9	Medium	Standard PPE ensemble; training, equipment, training
17	Site housekeeping	Slips/trips/falls, bio hzds	1	1	1	Low	Standard PPE ensemble

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

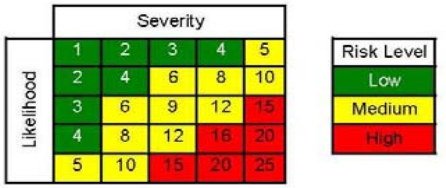
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
SUMMARY OF CONTROLS	Task Name: Groundwater Sampling		Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☑ Nitrile Gloves for Sampling
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-307-PR Housekeeping, Worksite	S3NA-520-PR Spill Response, Incidental	DOT Level I Shippers Training
2 Equipment Specific	S3NA-308-PR Manual Lifting, Field	S3NA-405-PR Drilling and Boring	
3 First Aid/CPR	S3NA-305-PR Hand and Power Tools		
4	S3NA-507 PR Hazardous Materials Communication		
5	S3NA-509-PR Hazardous Waste Operations and Er		
6	S3NA-511-PR Heat Stress Prevention		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Groundwater Sampling	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☐ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Hand Auger Sampling		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Determine sampling area	Slips, trips, falls, biological	1	1	1	Low	Standard PPE ensemble; training
3	Verify subsurface utility clearances were completed	Slips, trips, falls, biological	2	2	4	Low	Standard PPE ensemble; training
4	Assembel sample collection media, tools and supplies	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
5	Don appropriate PPE	None	3	4	12	Medium	Standard PPE ensemble; training
6	Correct any equipment deficiencies	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
7	Position had auger in front of you and establish footing	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training, equipment
8	Position hand auger into soil and slowly turn	Slips,trips,falls,cuts,lifting,bio	2	3	6	Medium	Standard PPE ensemble; training, equipment
9	Remove hand auger from ground & set on plastic sheeting	Slips,trips,falls,cuts,lifting,bio	3	4	12	Medium	Standard PPE ensemble; training, equipment
10	Use hand trowel to collect soil at bottom of hole, record depth	H2S, Oxygen, CO, LEL, PID	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
11	Place soil sample(s) with hand trowel into sample media & seal	Slips,trips,falls,cuts,lifting,pinch points	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
12	Decontaminate sampling tools and impervious supplies	Slips, trips, falls, biological	2	2	4	Low	Standard PPE ensemble; training, equipment
13	Collect IDW for characterization & disposal determination	Slips,trips,falls,cuts,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training, equipment
14	Prepare samples for shipment to designated laboratory	Slips,trips,falls,cuts,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

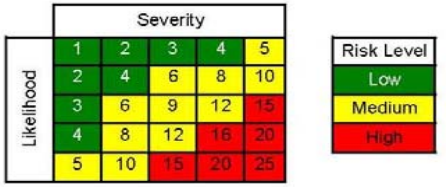
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Hand Auger Sampling	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves/Nitrile Gloves for Sampling
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
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LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
H2S	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field		HAZWOPER, DOT Level 1 Shipping Course
2 Equipment specific training	S3NA-307-PR Housekeeping, Worksite		
3	S3NA-405-PR Drilling and Boring		
4	S3NA-417-PR Utilities, Underground		
5	S3NA-517-PR Radiation, Non-Ionizing		
6	S3NA-520-PR Spill Response, Incidental		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Hand Auger Sampling	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

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Emergency Agencies / Public Utilities

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Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Heavy Equipment Operations		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Inspection of equipment (Inspection checklist)	Parts could fall on employee	1	1	1	Low	Standard PPE ensemble; training, equipment
3	Correct any identified deficiencies from inspection	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training, equipment
4	Verify subsurface utility clearances were completed	Explosion, shock, water damage	3	3	9	Medium	Standard PPE ensemble; training, equipment
5	Ensure all hazardous contaminants are removed	Slips,trips,falls, biological	2	3	6	Medium	Standard PPE ensemble; training, equipment
6	Barricade and isolate area/assigned observer	Public exposure	4	3	12	Medium	Standard PPE ensemble; training, equipment
7	Maintain line of sight and communications with driver	Could be run over	4	3	12	Medium	Standard PPE ensemble; training, equipment and communications
8	Proceed with operation systematically	Slips,trips,falls, biological, noise	1	1	1	Low	Standard PPE ensemble; training, equipment
9	Complete tasking	Slips,trips,falls, biological	2	2	4	Low	Standard PPE ensemble; training, equipment
10	End of the day housekeeping	Slips,trips,falls, biological	2	2	4	Low	Standard PPE ensemble; training, equipment
11							
12							
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Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

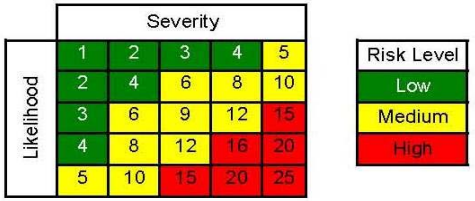
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Heavy Equipment Operations	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Glover
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field	S3NA-511-PR Heat Stress Prevention	Qualified equipment operators
2 Equipment specific training	S3NA-309-PR Mobile or Heavy Equipment	S3NA-517-PR Radiation, Non-Ionizing	
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-417-PR Utilities, Underground		
5	S3NA-520-PR Spill Response, Incidental		
6	S3NA-406-PR Electrical Lines, Overhead		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Heavy Equipment Operations	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)		
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: High Pressure Washer Operations	Regularity of Task: One-time ☐	Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tailgate safety meeting	None	1	1	1	Low	Standard PPE ensemble; training
2	Pre-op inspection of equipment	Slips,trips,falls,cuts,lifting,pinch points	1	1	1	Low	Standard PPE ensemble; training
3	Inspect and don appropriate PPE	None	2	2	4	Low	Standard PPE ensemble; training
4	Start pressure washer, clean surfaces	Slips,trips,falls, noise, overspray	3	4	12	Medium	Standard PPE ensemble; training, equipment
5	Shut off and allow engine to cool	Slips,trips,falls, biological, cuts	3	4	12	Medium	Standard PPE ensemble; training, equipment
6	Fil fuel tank to 1/2" below bottom of filler neck	Slips,trips,fall,bio,gasoline	3	3	9	Medium	Standard PPE ensemble; training, ground metal gas can
7	Wipe us spilled fuel before restarting engine	Skin exposure to fuels, heat	2	2	4	Low	Standard PPE ensemble; training, equipment
8	Stop work before dark to clean up the work area	Slips,trips,falls,bio,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training
9							
10							
11							
12							
13							
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17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

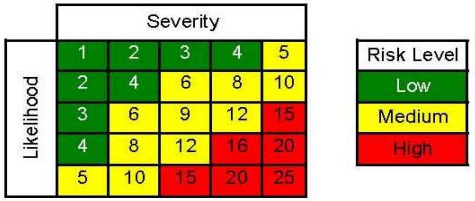
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: High Pressure Washer Operations	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection (where required)
- ☑ Face shield, apron, butyl rubber gloves
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-305-PR Hand and Power Tools	S3NA-517-PR Radiation, Non-Ionizing	Qualified equipment operators
2 Equipment specific training	S3NA-307-PR Housekeeping, Worksite		
3	S3NA-308-PR Manual Lifting, Field		
4	S3NA-309-PR Mobile or Heavy Equipment		
5	S3NA-510-PR Hearing Conservation Program		
6	S3NA-511-PR Heat Stress Prevention		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: High Pressure Washer Operations	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Hollow Stem Drilling	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Inspection of equipment (Inspection checklist)	Pinch points, nicks	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
3	Correct any identified deficiencies from inspection	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training
4	Verify subsurface utility clearances were completed	Slips, trips and falls, bio hazards	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
5	Position rig over intended drilling/sampling location	Slips, trips and falls, bio hazards	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
6	Ensure that all push rods are racked	Unsecure rods could fall	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
7	Initiate Hollow Stem activities or sampling	H2S, Oxygen, CO, LEL, PID	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
8	Measure/evaluate %LEL, VOCs various levels	H2S, Oxygen, CO, LEL, PID	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
9	Remove rods, auger and rack them upon removal	Pinch points, nicks	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
10	Decontaminate rods and auger	Splashing of contaminants	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
11	Collect rinsate	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
12	Wipe off rods and dispose of non-IDW trash	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
13	Daily housekeeping around the site	Slips, trips and falls, bio hazards	2	2	4	Low	Standard PPE ensemble; training
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Hollow Stem Drilling	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection
- ☑ Nitrile Gloves for Sampling
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
H2S	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field	S3NA-309-PR Mobile or Heavy Equipment	Competent Rig Operator
2 Equipment specific training	S3NA-405-PR Drilling and Boring	S3NA-509-PR Hazardous Waste Operations and	
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-417-PR Utilities, Underground		
5	S3NA-520-PR Spill Response, Incidental		
6	S3NA-406-PR Electrical Lines, Overhead		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Hollow Stem Drilling	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
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Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
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Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346
	Common Ground Alliance Nationwide (CALL B 4 U Dig)		811

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Loading and Hauling Materials		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	Pinch points, slips, trips and falls	1	1	1	Low	Standard PPE ensemble; training, equipment
2	Verify locations of soil to be separated and removed	Other moving heavy equipment	1	1	1	Low	Standard PPE ensemble; training, equipment
3	Conduct pre-op inspection of backhoe/frontend loader	None	1	1	1	Low	Standard PPE ensemble; training, equipment
4	Don applicable PPE	None	1	1	1	Low	Standard PPE ensemble; training, equipment
5	Correct any deficiencies identified during inspection	Biological,slip, trips and falls	2	3	6	Medium	Standard PPE ensemble; training, equipment
6	Inspect PPE	None	2	2	4	Low	Standard PPE ensemble; training, equipment
7	Don appropriate PPE (as needed)	None	2	2	4	Low	Standard PPE ensemble; training, equipment and communications
8	Establish spotter for removal operations	Roll overs	2	3	6	Medium	Standard PPE ensemble; training, equipment
9	Commence removal/placement operations	Awareness of surrounding area	3	4	12	Medium	Standard PPE ensemble; training, equipment and communications
10	Complete taskings	Roll overs	3	4	12	Medium	Standard PPE ensemble; training, equipment and communications
11	Service equipment	Pinch points, slips, trips and falls	2	2	4	Low	Standard PPE ensemble; training, equipment
12	House keeping	Biological,slip, trips and falls	2	2	4	Low	Standard PPE ensemble; training, equipment
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

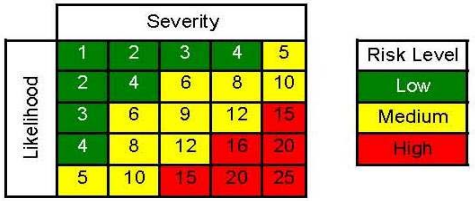
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Loading and Hauling Materials	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Glover
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field		Safeland Training
2	S3NA-309-PR Mobile or Heavy Equipment		
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-520-PR Spill Response, Incidental		
5			
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Loading and Hauling Materials	Regularity of Task:	One-time ☐ Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies		Other Emergency Plan Details
☑ First Aid Kit - Type:	☑ Eye Wash	Good Shepherd Occ Med Clinic Marshall
☐ Blankets / Survival:	☐ Spill Kit	614 S. Grove Street
☑ Fire Extinguishers Type:	☐ Other:	Marshall, Texas 75670
☑ Communication Device		(903) 927-6240
☑ Vehicle Safety Equipment		

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Lockout/Tagout		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Inspection of equipment (Inspection checklist)	Slips,trips,falls,cuts,lifting,pinch points	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
3	Veriffy energy source is deenergized to the area/building	Electrical, Water, Steam, Chemical	2	3	6	Medium	Standard PPE ensemble; training
4	LOTO main energy source (valve, panel) to area/building	Slips,trips,falls,cuts,lifting,pinch points	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
5	Place LOTO with another's if already existing	Slips,trips,falls,cuts,lifting,pinch points	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
6	Perform required work	Slips,trips,falls,cuts,lifting,pinch points	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
7	Inspect all outlets/sources, fixture, valves prior to reenergizing	Slips,trips,falls,cuts,lifting,pinch points	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
8	Inform all local workers the system is about to be energized	Slips,trips,falls,cuts,lifting,pinch points	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
9	Disengage the LOTO device and reenergize the source/system	Slips,trips,falls,cuts,lifting,pinch points	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
10	Inspect connects and ensure system is working properly	Electrical, Water, Steam, Chemical	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
11	Daily housekeeping around the site	Slips,trips,falls,cuts,lifting	2	3	6	Medium	Standard PPE ensemble, training
12							
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level: Low, Medium, High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Lockout/Tagout	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves/Nitrile Sampling Gloves
- ☑ Hearing Protection
- ☑ Fall Protection(if greater than 6' above ground surface)
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-302-PR Electrical, General	S3NA-507 PR Hazardous Materials Communica	
2 Equipment specific training	S3NA-307-PR Housekeeping, Worksite	S3NA-508-PR Hazardous Materials Handling ar	
3 Biological Hazards	S3NA-308-PR Manual Lifting, Field	S3NA-410-PR Hazardous Energy Control	
4 Lockout/Tagout training	S3NA-406-PR Electrical Lines, Overhead	S3NA-307-PR Housekeeping, Worksite	
5	S3NA-414-PR Railway Sites	S3NA-417-PR Utilities, Underground	
6	S3NA-417-PR Utilities, Underground		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Lockout/Tagout	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Mob and Demob	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing, Inspect equipment	None	1	1	1	Low	
2	Go over equipment safety cards where applicable	None	1	1	1	Low	
3	Brief and follow local safety criteria for the site visiting	None	1	1	1	Low	
4	All loads in excess of 49 pounds require use of mechanical	None	1	1	1	Low	Obtain correct equipment to assist or additional personnel
5	aids or assistance from other personnel.	None	1	1	1	Low	
6	Use spotters when loading/unloading heavy equipment,	None	1	1	1	Low	Safety cones, additional personnel
7	forklifts, etc. Stand clear of these operations.	None	1	1	1	Low	
8	Do not enter tank, vats, sumps, holes, or other potential	None	1	1	1	Low	Permits, training, evaluations
9	confined spaces without a Confined Space Entry Procedure,	None	1	1	1	Low	
10	Hazard Evaluation, and Permit completed.	None	1	1	1	Low	
11	Ensure all project supplies are suitable for transportation.	None	1	1	1	Low	Is equipment too sensitive for transport
12	Ensure that equipment, materials, chemicals, etc. have been	None	1	1	1	Low	Pretrip evaluation checklist, tie downs
13	secured for transportation	None	1	1	1	Low	
14	DO NOT overload trucks, trailers, etc. If more room is needed,	None	1	1	1	Low	GVWR
15	or loads are to large, obtain additional transportation.	None	1	1	1	Low	
16	Inspect Equipment / complete equip. inspection forms	None	1	1	1	Low	
17	Correct any deficiency	None	1	1	1	Low	

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

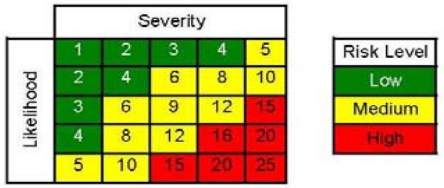
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Mob and Demob	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-305-PR Hand and Power Tools		
2 First Aid/CPR	S3NA-308-PR Manual Lifting, Field		
3			
4			
5			
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Mob and Demob	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)		
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies		Other Emergency Plan Details
☑ First Aid Kit - Type:	☑ Eye Wash	Good Shepherd Occ Med Clinic Marshall
☐ Blankets / Survival:	☐ Spill Kit	614 S. Grove Street
☐ Fire Extinguishers Type:	☐ Other:	Marshall, Texas 75670
☑ Communication Device		(903) 927-6240
☑ Vehicle Safety Equipment		

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
TASK HAZARD ANALYSIS	Task Name: Monitoring Well Development		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification (*before controls*) Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Inspection of equipment/location (Inspection checklist)	Slips,trips,falls,cuts,lifting,pinch points	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
3	Correct any identified deficiencies from inspection	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training
5	Measure/evaluate %LEL and VOCs at well head	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
6	Measure Initial depth to water	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
7	Perform well purging using manual bailer or pump	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
8	Perform well surging	Splashing of contaminants, lifting	2	4	12	Medium	Standard PPE ensemble; training, meters, equipment
9	Collect development fluids/olids	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
10	Daily housekeeping around the site	Slips,trips,falls,cuts,lifting	2	2	4	Low	Standard PPE ensemble
11							
12							
13							
14							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Monitoring Well Development	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 5 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
H2S	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 HAZWOPER 8HR	S3NA-308-PR Manual Lifting, Field	S3NA-309-PR Mobile or Heavy Equipment	Qualified equipment operators (rig operator)
2 Biological hazard	S3NA-405-PR Drilling and Boring		
3 CN FRA and E-railsafe	S3NA-307-PR Housekeeping, Worksite		
4 DOT Level 1 Shipper	S3NA-417-PR Utilities, Underground		
5	S3NA-520-PR Spill Response, Incidental		
6	S3NA-406-PR Electrical Lines, Overhead		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Monitoring Well Development	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Mowing and Brush Cutting		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Go over equipment safety cards, inspect equipment to be used	None	1	1	1	Low	Standard PPE ensemble; training
3	Review work plan of area to be mowed or brush to be cut	None	1	1	1	Low	Standard PPE ensemble; training
4	Put on PPE.	Slips,trips,falls,bio,noise, blisters	2	2	4	Low	Hearing protection, foot covers (if required), safety glasses
6	Start mower and/or begin brush cutting.	Flying debris	3	3	9	Medium	Hearing protection, foot covers (if required), safety glasses
7	Shut off mower when finished	Slips,trips,falls,bio hazards	2	2	4	Low	Hearing protection, foot covers (if required), safety glasses
8	Store mower and or brush cutting tools.	Slips,trips,falls,bio hazards	2	2	4	Low	Standard PPE ensemble; training
9	Move to new location and repeat steps as needed.	Slips,trips,falls,bio hazards	2	2	4	Low	Standard PPE ensemble; training
10				1	0		
11					0		
12					0		
13					0		
14					0		
15					0		
16					0		
17					0		
18							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Mowing and Brush Cutting	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☐ CSA/ANSI-approved Hard Hat
- ☐ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Glover
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-305-PR Hand and Power Tools		Qualified equipment operators
2	S3NA-411-PR Machine Guarding		
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-510-PR Hearing Conservation Program		
5			
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Mowing and Brush Cutting	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVIY HAZARD ANALYSIS	Task Name: Sediment Sampling	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing, Inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Brief and follow local safety criteria for the site visiting	None	1	1	1	Low	Standard PPE ensemble; training
3	Determine sampling locations to characterize sediments/soils	Biological	2	3	6	Medium	Standard PPE ensemble; training
4	Ensure sample collection media, tools/supplies are available	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
5	Don appropriate PPE (after visual inspection)	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
6	Collect sediment/soil samples, log points & measurements	Slips, trips and falls, falling in lagoon	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
7	Decontaminate sampling tools and impervious supplies	Splash	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
8	Dispose of task related waste, i.e., rinsate, Tyvek suit,		2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
9	leather/nitrile gloves, etc. (IDW)				0		
10	Prepare samples for shipping to designated laboratory	Splash and exposure to soils	2	3	6	Medium	Standard PPE ensemble; training, equipment
11	(DOT Level I qualified & verify with DOT Level II Shipper)				0		
12					0		
13					0		
14					0		
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS

Task Name: Sediment Sampling

Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Glover
- ☑ Hearing Protection
- ☑ Personal Floatation Device
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	EZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	EZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	EZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)

1. Tool specific training
2.
3.
4.
5.
6.

Key SOPs (associated with this THA)

S3NA-307-PR Housekeeping, Worksite	S3NA-511-PR Heat Stress Prevention
S3NA-308-PR Manual Lifting, Field	S3NA-516-PR Radiation Safety Programs
S3NA-305-PR Hand and Power Tools	S3NA-520-PR Spill Response, Incidental
S3NA-419-PR Water, Marine Operations_Boating	
S3NA-507 PR Hazardous Materials Communication	
S3NA-509-PR Hazardous Waste Operations and En	

Client & Other Requirements

HAZWOPER, DOT Level I Shipping

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Sediment Sampling	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Seeding Operations	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	Pinch points, slips, trips and falls	1	1	1	Low	Standard PPE ensemble; training, equipment
2	Verify locations to be seeded	Slips, trips, falls, bio hazards	1	1	1	Low	Standard PPE ensemble; training, equipment
3	Don applicable PPE	None	1	1	1	Low	Standard PPE ensemble; training, equipment
4	Load seed into mechanism, do not lift over 49lbs by self	Manual lifting	1	1	1	Low	Standard PPE ensemble; training, equipment
5	Position equipment in intended location	Biological,slip, trips and falls	2	3	6	Medium	Standard PPE ensemble; training, equipment
6	Initiate seeding operation	None	2	2	4	Low	Standard PPE ensemble; training, equipment
7	Clean equipment at the end of the day	Splashes, pinch points	3	4	12	Medium	Standard PPE ensemble; training, equipment
8	Collect non-IDW waste daily	Biological,slip, trips and falls	3	4	12	Medium	Standard PPE ensemble; training, equipment
9	Service equipment	Pinch points, slips, trips and falls	2	2	4	Low	Standard PPE ensemble; training, equipment
10	House keeping	Biological,slip, trips and falls	2	2	4	Low	Standard PPE ensemble; training, equipment
11							
12							
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

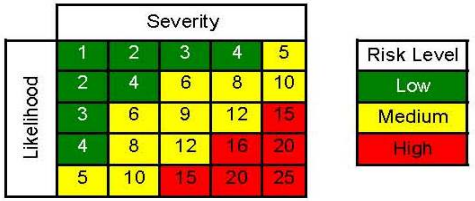
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Seeding Operations	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Glover
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field		
2 Equipment specific training	S3NA-309-PR Mobile or Heavy Equipment		
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-520-PR Spill Response, Incidental		
5			
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Seeding Operations	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Site Survey	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing	None	1	1	1	Low	Standard PPE ensemble; training
2	Drive to site	Driving hazards	2	1	2	Low	Standard PPE ensemble; training
3	Interview owner/manager of site (data gathering)	Slips/trips/falls, bio hzds					Standard PPE ensemble; training
4	Review any records of site	Slips/trips/falls, bio hzds	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
5	Perform visual inspection of site, including walking entire site	Slips/trips/falls, bio hzds	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
6	Gather data on physical nature of site	Slips/trips/falls, bio hzds	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
7	Gather data of physical contaminants on site	Slips/trips/falls, bio hzds	3	2	6	Medium	Standard PPE ensemble; training, equipment
8	Entry into confined spaces is not authorized	Slips/trips/falls, bio hzds	3	3	9	Medium	Standard PPE ensemble; training, equipment
9							
10							
11							
12							
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

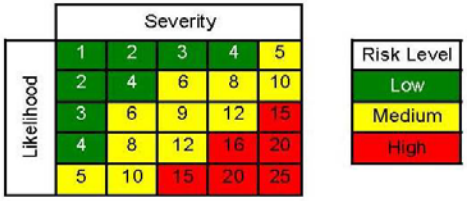
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
SUMMARY OF CONTROLS	Task Name: Site Survey		Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☐ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☐ Nitrile Gloves for Sampling
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-505-PR Cold Stress Prevention		Consult PPG Contractor Safety Manual for any additional requirements
2	S3NA-511-PR Heat Stress Prevention		
3			
4			
5			
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Site Survey	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954 (Reception is spotty)
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954 (Reception is spotty)
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954 (Reception is spotty)
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954 (Reception is spotty)
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Eye Wash
- ☐ Blankets / Survival:
- ☐ Spill Kit
- ☐ Fire Extinguishers Type:
- ☐ Other:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Soil Removal Operations	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Conduct tailgate safety meeting.	Slips, trips, and falls.	1	2	2	Low	Standard PPE ensemble; training
2	Verify locations/anomalies for excavation/removal	Excavation collapse/cave in	2	2	4	Low	Standard PPE ensemble; training
3	Verify subsurface utility clearances	None	1	2	2	Low	Standard PPE ensemble; training
4	Conduct preop inspection of equipment to be used	Slips,trips,falls,cuts,lifting,pinch points	3	3	9	Medium	Standard PPE ensemble; training, equipment
5	Correct any deficiencies identified in the inspection	Slips,trips,falls,cuts,lifting,pinch points	3	3	9	Medium	Standard PPE ensemble; training, equipment
6	Inspect PPE	None	1	1	1	Low	Standard PPE ensemble; training
7	Don appropriate PPE	None	1	1	1	Low	Standard PPE ensemble; training
8	Position equipment in intended position	Slips,trips,falls, biological, noise	3	4	12	Medium	Standard PPE ensemble; training, equipment
9	Initiate removal of soil	Slips,trips,falls, biological, noise	3	4	12	Medium	Standard PPE ensemble; training, equipment
10	Utilize wet method to reduce airborne particulates	Dusts	2	2	4	Low	Standard PPE ensemble; training, equipment
11	Clean equipment at the end of the day	Slips,trips,falls, biological, noise, cuts	2	2	4	Low	Standard PPE ensemble; training, equipment
12	Collect IDW and non-IDW waste daily	Slips,trips,falls, biological	2	2	4	Low	Standard PPE ensemble; training, equipment
13	Daily housekeeping around the site	Slips,trips,falls, biological	1	1	1	Low	Standard PPE ensemble; training
14							
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

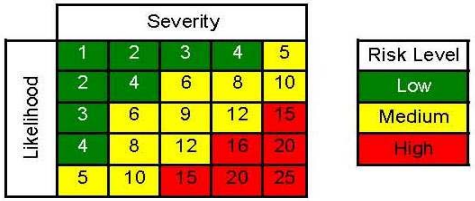
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS

Task Name: Soil Removal Operations

Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection (where required)
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID and H2S	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Aerosols	BZ & EZ, 30 min	>05-10 mg/m^3 or 2.5@EZ	Upgrade to Level C, Implement dust suppression measures; contact the SSO & SP

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Field Safety	S3NA-303-PR Excavation and Trenching	S3NA-510-PR Hearing Conservation Progra	Subcontractor is to provide the OSHA Competent Person for Excavation and provide proper documentation to AECOM prior to start of site work. Daily inspection form to be completed by Competent Person as well.
2 General Excavation Safety	S3NA-309-PR Mobile or Heavy Equipment	S3NA-511-PR Heat Stress Prevention	
3 Trench/Excavation Safety	S3NA-307-PR Housekeeping, Worksite	S3NA-517-PR Radiation, Non-Ionizing	
4 Hearing Protection	S3NA-312-PR Stairways and Ladders		
5 Biological Hazards	S3NA-406-PR Electrical Lines, Overhead		
6 First Aid/CPR	S3NA-417-PR Utilities, Underground		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Soil Removal Operations	Regularity of Task: One-time ☑	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Soil Sample Collection		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification (*before controls*) Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing, Inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Brief and follow local safety criteria for the site visiting	None	1	1	1	Low	Standard PPE ensemble; training
3	Determine sampling locations to characterize sediments/soils	Biological	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
4	Ensure sample collection media, tools/supplies are available	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
5	Don appropriate PPE (after visual inspection)	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
6	Collect sediment/soil samples, log points & measurements	Slips, trips and falls, falling in lagoon	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
7	Decontaminate sampling tools and impervious supplies	Splash	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
8	Dispose of task related waste, i.e., rinsate, Tyvek suit,	Splash	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
9	leather/nitrile gloves, etc. (IDW)				0		
10	Prepare samples for shipping to designated laboratory	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
11	(DOT Level I qualified & verify with DOT Level II Shipper)				0		
12							
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

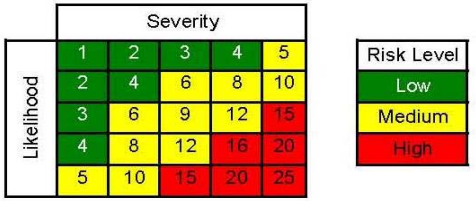
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
SUMMARY OF CONTROLS	Task Name: Soil Sample Collection		Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☑ Nitrile Gloves for Sampling
- ☐ Fall Protection
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-307-PR Housekeeping, Worksite	S3NA-520-PR Spill Response, Incidental	DOT Level I Shippers Training
2	S3NA-308-PR Manual Lifting, Field		
3	S3NA-305-PR Hand and Power Tools		
4	S3NA-507 PR Hazardous Materials Communication		
5	S3NA-509-PR Hazardous Waste Operations and Er		
6	S3NA-511-PR Heat Stress Prevention		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Soil Sample Collection	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
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Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)		
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Soil Tilling and Agitation Operations		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Tail gate safety briefing,inspect equipment	Pinch points, slips, trips and falls	1	1	1	Low	Standard PPE ensemble; training, equipment
2	Verify locations of soil to be tilled and agitated	Slips, trips, falls, bio hazards	1	1	1	Low	Standard PPE ensemble; training, equipment
3	Verify subsurface utility clearances were completed	None	1	1	1	Low	Standard PPE ensemble; training, equipment
4	Don applicable PPE	None	1	1	1	Low	Standard PPE ensemble; training, equipment
5	Correct any deficiencies identified during inspection	Biological,slip, trips and falls	2	3	6	Medium	Standard PPE ensemble; training, equipment
6	Position equipment in intended location	None	2	2	4	Low	Standard PPE ensemble; training, equipment
7	Initiate tilling and agitation of soil (add chemicals where necessary)	Hitting covers items, moving equip	2	2	4	Low	Standard PPE ensemble; training, equipment and communications
8	Utilize wetting method to reduce airborne particulates	Roll overs	2	3	6	Medium	Standard PPE ensemble; training, equipment
9	Clean equipment at the end of the day	Splashes, pinch points	3	4	12	Medium	Standard PPE ensemble; training, equipment and communications
10	Collect non-IDW waste daily	Biological,slip, trips and falls	3	4	12	Medium	Standard PPE ensemble; training, equipment and communications
11	Service equipment	Pinch points, slips, trips and falls	2	2	4	Low	Standard PPE ensemble; training, equipment
12	House keeping	Biological,slip, trips and falls	2	2	4	Low	Standard PPE ensemble; training, equipment
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level: Low / Medium / High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS

Task Name: Soil Tilling and Agitation Operations

Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Glover
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field		
2 Equipment specific training	S3NA-309-PR Mobile or Heavy Equipment		
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-520-PR Spill Response, Incidental		
5			
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Soil Tilling and Agitation Operations	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
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Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Utility Clearance		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Verify with Minnesota One-Call System/BNSF Undgr Cable	None	1	1	1	Low	Standard PPE ensemble; training, equipment
3	Complete paper verification and mark areas	None	1	1	1	Low	Standard PPE ensemble; training, equipment
4	Don applicable PPE	None	1	1	1	Low	Standard PPE ensemble; training, equipment
5	Preview your walking path for hazards	Biological,slip, trips and falls	2	3	6	Medium	Standard PPE ensemble; training, equipment
6	Prior to digging with equip, probe area at least 3' down,	Public exposure	4	3	12	Medium	Standard PPE ensemble; training, equipment
7	Probing area is to verify utility checks were correct.	Could be run over	4	3	12	Medium	Standard PPE ensemble; training, equipment and communications
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Utility Clearance	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Glover
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field		
2	S3NA-309-PR Mobile or Heavy Equipment		
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-417-PR Utilities, Underground		
5	S3NA-520-PR Spill Response, Incidental		
6	S3NA-406-PR Electrical Lines, Overhead		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Utility Clearance	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Water Treatment System O&M		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing, inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training
2	Identify activity to perform/lockout tagout appropriate system(s)	Potential to break sample containers	2	1	2	Low	Standard PPE ensemble; training
3	Don appropriate PPE and ensure adequate ventilation	Driving hazards	1	1	1	Low	Standard PPE ensemble; training
4	Do not enter confined spaces without approved permit	Being overcome by vapors	1	1	1	Low	Standard PPE ensemble; training
5	Open appropriate vessel and allow to ventilate for 15 minutes	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment, training
6	Measure/evaluate %LEL and VOCs	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment, training
7	Ensure secondary containment for items being removed	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment, training
8	If required connect hoses & ensure no leaks (transfer vehicle)	H2S, Oxygen, CO, LEL, PID	1	1	1	Low	Standard PPE ensemble; training, meters, equipment, training
9	Remove filters, product, water and vapors (as or if required)	H2S, Oxygen, CO, LEL, PID	1	1	1	Low	Standard PPE ensemble; training, meters, equipment, training
10	Ensure no spillage while installing/removing filters&hoses	Slips/trips/falls, bio hzds, spills	1	1	1	Low	Standard PPE ensemble; training
11	Package filters for proper disposal or vacuum truck departs for	Slips/trips/falls,bio hzds,splash/spills/monitor					Standard PPE ensemble; training; weight restrictions, additional personnel
12	disposal facility or next vessel		1	1	1	Low	
13	Inspect area/vehicles/vessels for leaks	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment, training
14	Obtain disposal facility load ticket from disposal facility indicating	None	1	1	1	Low	Standard PPE ensemble; training
15	proper disposal						
16	Site housekeeping	Slips/trips/falls, bio hzds	2	2	4	Low	Standard PPE ensemble; training, equipment
17							
18							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

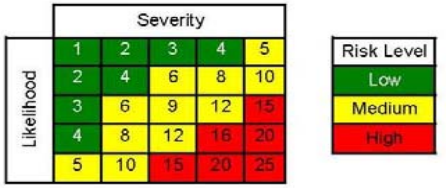
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM

Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
Task Name: Water Treatment System O&M		Regularity of Task: One-time ☐ Routine ☑

SUMMARY OF CONTROLS

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection
- ☑ Nitrile Gloves for Sampling
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-301-PR Confined Spaces	S3NA-308-PR Manual Lifting, Field	Competent plant operators
2 Equipment Specific	S3NA-302-PR Electrical, General	S3NA-309-PR Mobile or Heavy Equipment	
3 First Aid/CPR	S3NA-303-PR Excavation and Trenching	S3NA-312-PR Stairways and Ladders	
4	S3NA-304-PR Fall Protection	S3NA-406-PR Electrical Lines, Overhead	
5	S3NA-305-PR Hand and Power Tools	S3NA-410-PR Hazardous Energy Control	
6	S3NA-307-PR Housekeeping, Worksite	S3NA-411-PR Machine Guarding	

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Water Treatment System O&M	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☐ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
TASK HAZARD ANALYSIS	Task Name: Well Abandonement and Casing Removal		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Inspection of equipment (Inspection checklist)	Slips,trips,falls,cuts,lifting,pinch points	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
3	Correct any identified deficiencies from inspection	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training
5	Position rig over intended well/casing removal location	Slips,trips,falls,cuts,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
6	Ensure that area is clear	Unsecure rods could fall	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
7	Initiate well/casing removal activities	H2S, Oxygen, CO, LEL, PID	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
8	Measure/evaluate %LEL and VOCs at well head	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
9	Ensure lay down area is clear	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training, equipment
10	Decontaminate (where required/dispose of well casing	Splashing of contaminants	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
11	Collect rinsate	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, equipment
12	Backfill with appropriate materials and bring to grade	Pinch points, nicks, lifting	2	2	4	Low	Standard PPE ensemble; training, equipment
13	Dispose of non-IDW trash	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training, equipment
14	Daily housekeeping around the site	Slips,trips,falls,cuts,lifting	2	2	4	Low	Standard PPE ensemble
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

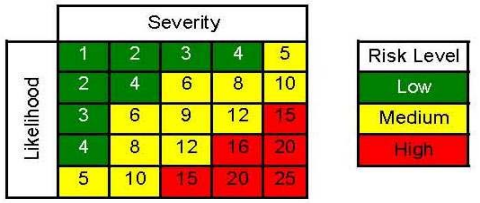
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Well Abandonement and Casing Removal	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field	S3NA-309-PR Mobile or Heavy Equipment	Qualified equipment operators (rig operator), Safeland Training
2 Equipment specific training	S3NA-405-PR Drilling and Boring		
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-417-PR Utilities, Underground		
5	S3NA-520-PR Spill Response, Incidental		
6	S3NA-406-PR Electrical Lines, Overhead		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Well Abandonement and Casing Removal	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
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Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Well Pad Protection, Development and Reestablishment		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Inspection of equipment (Inspection checklist)	Slips,trips,falls,cuts,lifting,pinch points	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
3	Correct any identified deficiencies from inspection	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training, equipment
5	Identify wells to be demolished/reestablished/don PPE	Slips,trips,falls,cuts,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training
6	Evaluate surroundings for additional hazards	Slips,trips,falls,bio hazards	2	3	6	Medium	Standard PPE ensemble; training
7	Ensure lay down area is clear	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training
8	Measure/evaluate %LEL and VOCs at well head	H2S, Oxygen, CO, LEL, PID	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
9	Initiate pad activities	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training, equipment
10	Protect wells with orange fencing/flags/jersey barriers	Splashing of contaminants	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
11	Remove soil to expose casing to cut pipe with hand tools	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, equipment
12	at desired height (approximately 6" bgs)	Pinch points, nicks, lifting	2	2	4	Low	Standard PPE ensemble; training, equipment
13	Install locking cap on top of riser	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training, equipment
14	Construct flush mount well cover	Slips,trips,falls,cuts,lifting	2	2	4	Low	Standard PPE ensemble; training, equipment
15	Clean area and reseed if required	Slips,trips,falls,cuts,lifting	2	2	4	Low	Standard PPE ensemble; training, equipment
16	Move to next location and repeat steps 2 thru 15	Slips,trips,falls,cuts,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training, equipment
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level: Low, Medium, High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Well Pad Protection, Development and Reestablishment	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☑ Hearing Protection
- ☐
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-308-PR Manual Lifting, Field	S3NA-309-PR Mobile or Heavy Equipment	Qualified equipment operators (rig operator), Safeland Training
2 Equipment specific training	S3NA-405-PR Drilling and Boring		
3	S3NA-307-PR Housekeeping, Worksite		
4	S3NA-417-PR Utilities, Underground		
5	S3NA-520-PR Spill Response, Incidental		
6	S3NA-406-PR Electrical Lines, Overhead		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Well Pad Protection, Development and Reestablishment	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
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Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
	Incident Reporting Line (BY THE END OF THE SHIFT)	1.800.348.5046	
Aaron Williams	Designated USACE Site Rep	(918) 669-4915	
Rose M. Zeiler	Longhorn AAP Site Manager	(479) 635-0110	
Eric Olson	DOT/IATA Shipping Expert	(864) 297-3102	(864) 918-2302

Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
Karnack/Longhorn	Police		911/(903) 935-4525
Karnack/Longhorn	Fire		911/(903) 935-4580
Karnack	Ambulance		911
Longview Regional Medical Center	Nearest Hospital / Clinic	2901 North 4th Street, Longview, Texas 75605	(903) 758-1818
	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Well Maintenace and Repair Operations		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification *(before controls)* Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Tail gate safety briefing,inspect equipment	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	Inspection of equipment (Inspection checklist)	Slips,trips,falls,cuts,lifting,pinch points	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
3	Correct any identified deficiencies from inspection	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training
4	Verify Overhead utility clearances were completed	Electrical Shock	4	3	12	Medium	Standard PPE ensemble; training, meters, equipment
5	Deengerize utility service to the well	Electrical Shock	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
6	Position equipment over well location	Slips,trips,falls,cuts,lifting,pinch points	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
7	Ensure that all clamps and lockdowns are in place and secure	Unsecure rods could fall	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
8	Initiate pipe removal activity	H2S, Oxygen, CO, LEL, PID	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
9	Remove pipe sections and rack them upon removal	Slips,trips,falls,cuts,lifting,pinch points	3	4	12	Medium	Standard PPE ensemble; training, meters, equipment
10	Decontaminate pipe	Splashing of contaminants	2	3	6	Medium	Standard PPE ensemble; training, meters, equipment
11	Collect rinsate	Splashing of contaminants	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
12	Wipe off pipe and dispose of non-IDW trash	Pinch points, nicks	2	2	4	Low	Standard PPE ensemble; training, meters, equipment
13	Daily housekeeping around the site	Slips,trips,falls,cuts,lifting	2	2	4	Low	Standard PPE ensemble
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

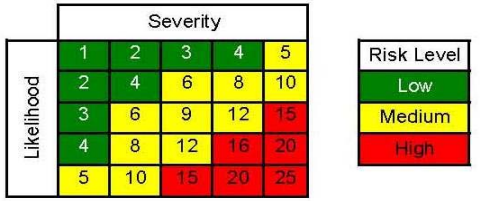
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Well Maintenace and Repair Operations	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves/Nitrile Sampling Gloves
- ☑ Hearing Protection
- ☑ Fall Protection(if greater than 6' above ground surface)
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☐ No air monitoring required ☑ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity
VOCs by PID	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
Oxygen	BZ, 30 min	> 19.5 and 23.5 <	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
LEL	BZ, 30 min	< 10%	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.
H2S	BZ, 30 min	< 10 ppm	Continue work and monitoring. If significant changes exist in this acceptable range, contact the SSO to investigate the potential for contributing factors.

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-307-PR Housekeeping, Worksite	S3NA-302-PR Electrical, General	Qualified equipment operators (Tractor operator)
2 Equipment specific training	S3NA-308-PR Manual Lifting, Field	S3NA-508-PR Hazardous Materials Handling ar	
3 Biological Hazards	S3NA-309-PR Mobile or Heavy Equipment	S3NA-517-PR Radiation, Non-Ionizing	
4 Electrical Safety/Awarness LOTO	S3NA-405-PR Drilling and Boring	S3NA-520-PR Spill Response, Incidental	
5	S3NA-406-PR Electrical Lines, Overhead	S3NA-310-PR Rigging, Hoisting, Cranes and Lif	
6			

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Well Maintenace and Repair Operations	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
Scott Beesinger	Site Supervisor	(903) 679-3448	(903) 217-9954
Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
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	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☑ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Working Alone on a HAZWOPER Site		Regularity of Task: One-time ☐ Routine ☑

	Job Event Sequence (List the major steps of the individual task)	Hazards (List primary hazards)	Hazard Classification (before controls) Severity	Likelihood	Risk Level	Hazard Classification	Controls (List controls that AECOM will implement)
1	Daily safety briefing (call PM/Designee when arriving site)	None	1	1	1	Low	Standard PPE ensemble; training, meters, equipment
2	While on site & prior to performing any critical task the	None	1	1	1	Low	Standard PPE ensemble; training
3	individual will contact the Job Super or PM (telecomm)						
4	Only voice communication will be acceptable	None	1	1	1	Low	Standard PPE ensemble; training
5	Don appropriate PPE (after visual inspection)	None	1	1	1	Low	Standard PPE ensemble; training
6	Ensure walk to eye wash is clear	Slips, trips and falls, falling in lagoon	3	4	12	Medium	Standard PPE ensemble; training, equipment
7	Ensure supplies are readily available	Slips, Trips, Falls, Splashes	2	3	6	Medium	Standard PPE ensemble; training, equipment
8	Add applicable material to attain desired effect	Splash	2	3	6	Medium	Standard PPE ensemble; training, equipment
9	Contact Job Super or PM by telecomm	None			0		Standard PPE ensemble; training
10	Clean area including chemicals	Slips, Trips, Falls, Splashes	1	1	1	Low	Standard PPE ensemble; training, equipment
11	Dispose/put away PPE (call PM/Designee when departing)	Slips, Trips, Falls, Splashes, Cuts			0		Standard PPE ensemble; training, equipment
12	Communicate with office or supervisor upon arrival,	None					Standard PPE ensemble; training
13	every hour and upon departure.						
14							
15							
16							
17							

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

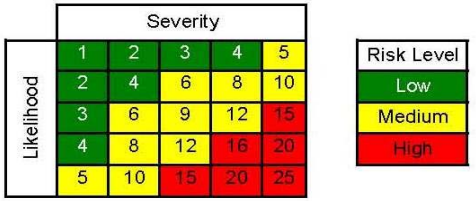
2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix



Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Working Alone on a HAZWOPER Site	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ CSA/ANSI Type II/III Reflective Traffic Safety Vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☑ Nitrile Gloves for Sampling
- ☐ Fall Protection
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Tool specific training	S3NA-307-PR Housekeeping, Worksite	S3NA-520-PR Spill Response, Incidental	DOT Level I Shippers Training
2	S3NA-308-PR Manual Lifting, Field		
3	S3NA-305-PR Hand and Power Tools		
4	S3NA-507 PR Hazardous Materials Communication		
5	S3NA-509-PR Hazardous Waste Operations and Er		
6	S3NA-511-PR Heat Stress Prevention		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Working Alone on a HAZWOPER Site	Regularity of Task: One-time ☐	Routine ☑

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
Dave Wacker	Project Manager	(210) 253-7514	(210) 859-1693
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Scott Beesinger	Site Safety Officer	(903) 679-3448	(903) 217-9954
Nash Doyle	District SH&E Manager	(312) 373-7813	(312) 593-8489
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Emergency Agencies / Public Utilities

Name	Type	Details	Phone Number
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Karnack	Ambulance		911
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	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☑ Vehicle Safety Equipment
- ☑ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
614 S. Grove Street
Marshall, Texas 75670
(903) 927-6240

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
ACTIVITY HAZARD ANALYSIS	Task Name: Working Elevated Areas	Regularity of Task: One-time ☐ Routine ☑	

	Job Event Sequence *(List the major steps of the individual task)*	Hazards *(List primary hazards)*	Hazard Classification (*before controls*) Severity	Likelihood	Risk Level	Hazard Classification	Controls *(List controls that AECOM will implement)*
1	Arrive at site and check in with the site supervisor	Heavy equipment/vehicles; slips/trips/falls	2	2	4	Low	Standard PPE ensemble
2	Tailgate Safety Briefing	Heavy equipment/vehicles; slips/trips/falls	2	2	4	Low	Standard PPE ensemble
3	Inspect/don PPE	None	1	1	1	Low	Training
4	Establish voice/visual contact site supervisor	Heavy equipment/vehicles; slips/trips/falls	4	2	8	Medium	Standard PPE ensemble; training
5	Verify pre-op inspections on equip are done	Heavy equipment/vehicles; slips/trips/falls	4	2	8	Medium	Standard PPE ensemble; training
6	Verify elevated area to be inspected	Slips/trips/falls; elevated platforms	4	2	8	Medium	Standard PPE ensemble; training
7	Verify competent equipment operators/errectors	Vehicular incidents, personnel injuries	5	2	10	Medium	Standard PPE ensemble; training, specific equipment training
8	Verify fall protection program is in place	Slips/trips/falls; contusions	4	4	16	High	Standard PPE ensemble; fall protection training
9	Verify barrier placed to prevent unwanted entry	Slips/trips/falls; falling debris; contusions	4	4	16	High	Standard PPE ensemble; training
10	Verify nobody is below suspended loads	Overhead hazards	4	3	12	Medium	Standard PPE ensemble; training
11	Verify scaffolds are inspected (if present)	Collasping failure	4	3	12	Medium	Standard PPE ensemble; training
12	Check out with site supervisor	Heavy equipment/vehicles; slips/trips/falls	3	2	6	Medium	Standard PPE ensemble
13					0		
14					0		
15					0		
16					0		
17					0		

Hazard Classification Guidelines

Severity

1 Remote potential for injury, property damage/$ loss, or env damage

2 Potential for minor first aid injury, property damage/$ loss, or environmental damage

3 Potential for moderate personnel injuries, including medical treatment, property damage/$ loss, environmental damage, or negative public impact

4 Potential for a serious injury, major property damage/$ loss, serious impact to the environment, and public health

5 Catastrophic damage to people, property/equipment, environment, or public health

Likelihood of Occurrence

1 Very unlikely

2 Unlikely

3 Likely

4 Very likely

5 Certain

Hazard Classification Matrix

Likelihood \ Severity	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

Risk Level
Low
Medium
High

Risk Level = Likelihood x Severity

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015

SUMMARY OF CONTROLS	Task Name: Working Elevated Areas	Regularity of Task: One-time ☐ Routine ☑

Personal Protective Equipment (*check all that apply*)

- ☑ CSA/ANSI Safety-Toed Boots (Leather or Rubber)
- ☑ CSA/ANSI Safety Glasses or Goggles
- ☑ CSA/ANSI-approved Hard Hat
- ☑ ANSI Type II reflective traffic safety vest
- ☑ Leather Gloves
- ☐ Hearing Protection
- ☑ Fall Protection
- ☐
- ☐
- ☐

Air Monitoring (reference HASP monitoring plan)

☑ No air monitoring required ☐ Air monitoring required (*see procedures below*)

Parameter	Location/Monitoring Interval	Response/Action Levels	Response Activity

Required Training (associated with this THA)	Key SOPs (associated with this THA)		Client & Other Requirements
1 Field Safety	S3NA-302-PR Electrical, General	S3NA-408-PR Elevated Work Platforms and Aerial Lifts	SPF 30+ sunscreen, Man-lift competent operator
2 Hearing Protection	S3NA-304-PR Fall Protection	S3NA-408-PR Elevated Work Platforms and Aerial Lifts	
3 Biological Hazards	S3NA-305-PR Hand and Power Tools		
4 First Aid/CPR	S3NA-307-PR Housekeeping, Worksite		
5 Fall Protection Training	S3NA-308-PR Manual Lifting, Field		
6 Scaffold construction awareness	S3NA-309-PR Mobile or Heavy Equipment		

Acknowledgement / Signatures

Project Manager / Supervisor (signature): DaveWacker Date: 04/21/14

Name	Signature	Company	Date	Name	Signature	Company	Date

S3NA-209-FM TASK HAZARD ANALYSIS

AECOM	Project Name: Remediation of Multiple Sites	Project Number: 60256135	Client: AFCEE/USACE
	Supervisor: Scott Beesinger	Project Manager: Dave Wacker	Location: Longhorn Army Ammunition Plant
	AHA Developed By: Dan Schillings		Date: April 2014 thru April 2015
EMERGENCY RESPONSE PLAN	Task Name: Working Elevated Areas	Regularity of Task: One-time ☐ Routine ☑	

Check-in Procedures

Check-in Times	Check-in Person	Phone Number	Cell Phone Number
8:00 am & 5:00 pm	Scott Beesinger	(903) 679-3448	(903) 217-9954
Alternate:			

Emergency Coordinators / Key Personnel

Name	Title	Phone Number	Cell Phone Number
Scott Beesinger	On-site First Aid Attendant	(903) 679-3448	(903) 217-9954
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	Poison Control Center		800.222.1222
	Pollution / Environmental		800.292.4706
	INFOTRAC (AECOM's account number 74984)		800.535.5053
	Tier II or SARA Title III Hot Line		800.424.9346

Emergency Equipment & Supplies

- ☑ First Aid Kit - Type:
- ☐ Blankets / Survival:
- ☐ Fire Extinguishers Type:
- ☑ Communication Device
- ☐ Vehicle Safety Equipment
- ☐ Eye Wash
- ☐ Spill Kit
- ☐ Other:

Other Emergency Plan Details

Good Shepherd Occ Med Clinic Marshall
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Marshall, Texas 75670
(903) 927-6240

Attachment B: Material Safety Data Sheets

EASTMAN KODAK
2,4,6-TRINITROTOLUENE (MINIMUM 15% WATER ADDED) Revised: 08/14/1988

MSDS Contents

SECTION I. IDENTIFICATION
SECTION II. PRODUCT AND COMPONENT HAZARD DATA
SECTION III. PHYSICAL DATA
SECTION IV. FIRE AND EXPLOSION HAZARD DATA
SECTION V. REACTIVITY DATA
SECTION VI. TOXICITY AND HEALTH HAZARD DATA
SECTION VII. VENTILATION AND PERSONAL PROTECTION
SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS
SECTION IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

MATERIAL SAFETY DATA SHEET

EASTMAN KODAK COMPANY
343 State Street
Rochester, New York 14650

For Emergency Health, Safety, and Environmental Information, call 716-722-5151
For all other purposes, call 800-225-5352, in New York State call 716-458-4014

Date of Revision: 08/14/88 Kodak Accession Number: 900268

SECTION I. IDENTIFICATION

- Product Name: 2,4,6-Trinitrotoluene (Minimum 15% water added)
- Synonym(s): 2-Methyl-1,3,5-trinitrobenzene
- Formula: C7 H5 N3 O6
- CAT No(s): 104 3074; 104 3082; 842 3675
- Chem. No(s): 00268
- Kodak's Internal Hazard Rating Codes: R: 3 S: 3 F: 3 C: 4-T

SECTION II. PRODUCT AND COMPONENT HAZARD DATA

COMPONENT(S):	Percent	ACGIH TLV(R)	CAS Reg. No.
2,4,6-Trinitrotoluene	ca. 85	0.5 mg/m3 (skin)	118-96-7
Water	ca. 15	---	7732-18-5

SECTION III. PHYSICAL DATA

- Appearance: Colorless crystalline solid or cream-colored powder
- Melting Point: 81-82 C (178-180 F)
- Vapor Pressure: Negligible
- Evaporation Rate (n-butyl acetate = 1): Negligible
- Volatile Fraction by Weight: ca. 15%
- Specific Gravity (Water = 1): 1.65
- Solubility in Water (by Weight): Negligible

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

- Flash Point: Not Applicable
- Extinguishing Media: Water spray; Dry chemical; Carbon dioxide
- Special Fire Fighting Procedures: Wear self-contained breathing apparatus and protective clothing. Use water spray to keep fire exposed containers cool. Fight fire from a protected location.
- Unusual Fire and Explosion Hazards: Fire or excessive heat may produce hazardous decomposition products. Flammable solid. Can be easily ignited and burns vigorously. Violent decomposition when heated under

confinement. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

SECTION V. REACTIVITY DATA

- Stability: Stable, however, can violently decompose above 255 C. Avoid temperatures above 155 C.
- Incompatibility: Reducing materials
- Hazardous Decomposition Products: Combustion will produce carbon dioxide and probably carbon monoxide. Oxides of nitrogen may also be present.
- Hazardous Polymerization: Will not occur.

SECTION VI. TOXICITY AND HEALTH HAZARD DATA

A. EXPOSURE LIMITS: TLV 0.5 mg/m3 (skin), ACGIH 1988-89; OSHA PEL 0.5 mg/m3, skin.

B. EXPOSURE EFFECTS: Systemic overexposure can cause blood disorders and liver injury. Signs of overexposure include dizziness, weakness, nausea and breathing difficulties.
Inhalation: Harmful if inhaled. Dust irritating.
Skin: Harmful if absorbed through the skin. Causes irritation. May cause allergic skin reaction.
Eye: May cause irritation.
Ingestion: Harmful if swallowed.

C. FIRST AID:
Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give exygen.
Skin: Immediately flush skin with plenty of water for at least 15 minutes. Get medical attention if symptoms are present after washing.
Eye: Immediately flush eyes with plenty of water for at least 15 minutes and get medical attention.
Ingestion: Drink 1-2 glasses of milk or water and induce vomiting. Call a physician immediately.
Note to physicians: Absorption of this product into the body leads to the formation of methemoglobin which, in sufficient concentration, causes cyanosis. Since reversion of methemoglobin to hemoglobin occurs spontaneously after termination of exposure, moderate degrees of cyanosis need be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of the entire contaminated area of the body, including scalp and nails, is of utmost importance. If cyanosis is severe, intravenous injection of mehtylene blue, one milligram per kilogram of body weight, may be of value.

SECTION VII. VENTILATION AND PERSONAL PROTECTION

A. VENTILATION:
Good general room ventilation should be used. Local exhaust may be needed to control airborne levels below recommended limits.

B. RESPIRATORY PROTECTION:
A NIOSH-approved dust respirator should be worn if needed.

C. SKIN AND EYE PROTECTION:
Protective gloves and clothing should be worn. Safety glasses, goggles, or a face shield should be worn.

SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS

Material is a flammable solid. Keep away from heat, sparks and flame. Use with adequate ventilation. Keep container closed. Fire or excessive heat may cause explosive decomposition. Keep away from fire.
Keep from contact with reducing materials. Keep container tightly closed and away from combustibles and oxidizing materials.
Since empty container retains product residue, follow label warnings even

after container is empty.
Keep container tightly closed to prevent loss of moisture.

SECTION IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Dissolve in a compatible solvent to yield a 10% solution. Dispose by incineration or contract with licensed chemical waste disposal agency. Discharge, treatment, or disposal may be subject to federal, state or local laws.

The information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

ABSOLUTE STANDARDS
ACETONE Revised: 01/02/2007

MSDS Contents

SECTION I
SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION
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SECTION VI - HEALTH HAZARD DATA
SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE
SECTION VIII - CONTROL MEASURES

ABSOLUTE STANDARDS INC.
PO BOX 5585
HAMDEN, CT 06518-0585

PHONE: 203-281-2917
FAX: 203-281-2922

MATERIAL SAFETY DATA SHEET (MSDS)

MAY BE USED TO COMPLY WITH OSHA'S HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200., SECTION (G)(C)(1).
STANDARD MUST BE CONSULTED FOR SPECIFIC REQUIREMENTS.
CONTACT NAME BELOW FOR FURTHER INFORMATION.

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
(NON-MANDATORY FORM)
FORM APPROVED
OMB NO.: 1218-0072

IDENTITY: ACETONE

CAS#: 00067-64-1

NOTE:
BLANK SPACES ARE NOT PERMITTED. IF ANY ITEM IS NOT APPLICABLE, OR NO INFORMATION IS AVAILABLE, THE SPACE MUST BE MARKED TO INDICATE THAT.

SECTION I

MANUFACTURER'S NAME: ABSOLUTE STANDARDS INC

ADDRESS(NUMBER, STREET, CITY, STATE, AND ZIP CODE):
44 ROSSOTTO DR.
HAMDEN CT, 06514

EMERGENCY TELEPHONE NUMBER: 1-203-281-2917

TELEPHONE NUMBER FOR INFORMATION: 1-203-281-2917

DATE PREPARED/REVISED: 1/2/07

SIGNATURE OF PREPARATOR (OPTIONAL): JACK CRISCIO

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS (SPECIFIC CHEMICAL IDENTITY; COMMON NAME(S))	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED	% (OPTIONAL)
ACETONE DIMETHYL KETONE; 2-PROPANONE; DIMETHYL	750 PPM	750 PPM	LD50(ORAL-RAT) (MG/KG)=9750	>99

SEE ATTACHED CERTIFIED WEIGHT REPORT FOR OTHER ANALYTES PRESENT AT TRACE

QUANTITIES.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 56 DEG. C

SPECIFIC GRAVITY (H2O=1): 0.79

VAPOR PRESSURE (MM HG): 181

MELTING POINT: -95 DEG. C

VAPOR DENSITY (AIR=1): 2

EVAPORATION RATE (BUTYL ACETATE=1): 14.4

SOLUBILITY IN WATER: 100%

APPEARANCE AND ODOR: CLEAR, COLORLESS LIQUID WITH CHARACTERISTIC SWEET ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): (CLOSED CUP) -17 DEG. C

FLAMMABLE LIMITS:
LEL: 2.6%
UEL: 13.0%

AUTOIGNITION TEMPERATURE: 464 DEG. C

EXTINGUISHING MEDIA:
USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE)

SPECIAL FIREFIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.
EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE: NONE IDENTIFIED.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
VAPOR MAY FORM ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED MAY INCLUDE: CARBON MONOXIDE, CARBON DIOXIDE.

SECTION V - REACTIVITY DATA

STABILITY:
UNSTABLE: ( )
STABLE: (X)
CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID):
STRONG OXIDIZING AGENTS, STRONG ACIDS, STRONG BASES, HALOGEN ACIDS AND HALOGEN COMPOUNDS, CAUSTICS, AMINES AND AMMONIA, CHLORINE AND CHLORINE COMPOUNDS.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:
CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

HAZARDOUS POLYMERIZATION:
MAY OCCUR ( )
WILL NOT OCCUR (X)
CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY:

INHALATION?
YES

SKIN?
YES

INGESTION?
YES

HEALTH HAZARDS (ACUTE AND CHRONIC):
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE CENTRAL NERVOUS SYSTEM DEPRESSION. KIDNEY DAMAGE, LIVER DAMAGE.

TARGET ORGANS: RESPIRATORY SYSTEM, LUNGS, EYES, SKIN.

CARCINOGENICITY:

NTP?
NO

IARC MONOGRAPHS?
NO

OSHA REGULATED?
NO

REPRODUCTIVE EFFECTS: NONE IDENTIFIED

SIGNS AND SYMPTOMS OF EXPOSURE:
INHALATION AND INGESTION ARE HARMFUL AND MAY BE FATAL. INHALATION AND INGESTION MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, IRRITATION OF RESPIRATORY TRACT, COMA, GASTROINTESTINAL IRRITATION AND UNCONSCIOUSNESS. CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION. PROLONGED SKIN MAY RESULT IN DERMATITIS.

EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:
CHRONIC RESPIRATORY DISEASE, SKIN DISORDERS, EYE DISORDERS.

EMERGENCY AND FIRST AID PROCEDURE:
TREATMENT FOR ACCIDENTAL INGESTION OF A SMALL AMOUNT OF ACETONE IS UNNECESSARY.
IF A LARGE AMOUNT HAS BEEN INGESTED, ADMINISTER AN AQUEOUS CHARCOAL SLURRY.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IN CASE OF CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE REUSE.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
SHUT OFF IGNITION SOURCES:
NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.

TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

WASTE DISPOSAL METHOD:
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002 (TOXIC WASTE)

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINERS TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

OTHER PRECAUTIONS:
USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS. STORAGE COLOR CODE RED (FLAMMABLE).

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE):
RESPIRATORY PROTECTION REQUIRED IF AIRBOURNE CONCENTRATION EXCEEDS TLV.
AT CONCENTRATIONS ABOVE 200 PPM, A SELF CONTAINED BREATHING APPARATUS IS ADVISED.

VENTILATION:
LOCAL EXHAUST:
SPECIAL: NA
MECHANICAL (GENERAL): YES
OTHER: NA

PROTECTIVE GLOVES: YES

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: SAFETY GOGGLES

WORK/HYGIENIC PRACTICES: GOOD LABORATORY PRACTICES

NOTE:
NA = NOT APPLICABLE OR NOT AVAILABLE.

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY TRAINED PERSONNEL, OR SUPERVISED BY A PERSON TRAINED IN CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, ABSOLUTE STANDARDS INC. CANNOT WARN OF ALL THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR SUBSTANCES. ABSOLUTE STANDARDS INC. WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. ABSOLUTE STANDARDS INC DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR APPLICATION. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY OR DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, ABSOLUTE STANDARDS INC. WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. IF YOU HAVE ANY QUESTIONS, PLEASE CALL TECHNICAL SERVICE AT 1-203-281-2917 FOR ASSISTANCE.

ACETONE-MSDS

PRINTED: 2/5/07

ABSOLUTE STANDARDS, INC.

(800)-368-1131

WWW.ABSOLUTESTANDARDS.COM

ISO 9001 QS REGISTERED
ISO 17025 QS ACCREDITED

CERTIFIED WEIGHT REPORT:

PART NUMBER: 95142

LOT NUMBER: 061008

DESCRIPTION:
PERFORMANCE EVALUATION SOIL CONC. #2
5 COMPONENTS

EXPIRATION DATE: 061011

NOMINAL CONCENTRATION (MICRO G/ML): VARIED

LOT #:

SOLVENT(S): E48E25 ACETONE

WEIGHT(S) SHOWN BELOW WERE COMBINED AND DILUTED TO (ML):
5E-05 BALANCE UNCERTAINTY

00190812

25.0 0.004 FLASK UNCERTAINTY

FORMULATED BY: JUSTIN DIPPOLD

REVIEWED BY: PEDRO L. RENTAS

DATE: 061008

MSDS INFORMATION:

COMPOUND	RM#	LOT NUMBER	NOMINAL CONC (MICRO G/ML)	PURITY	UNCERTAINTY PURITY	TARGET WEIGHT(G)
1. ALDRIN	9	122096	800	99	0.2	0.02022
2. G-BHC (LINDANE)	41	46601	488	99	0.2	0.01233
3. DIELDRIN	152	93096	1325	99	0.2	0.03349
4. ENDOSULFAN SULFATE	169	ER042406-04	1750	99	0.2	0.04423
5. HEPTACHLOR EPOXIDE	193	60197	613	98	0.2	0.01565

COMPOUND	ACTUAL WEIGHT(G)	*ACTUAL CONC (MICRO G/ML)	EXPANDED UNCERTAINTY
1. ALDRIN	0.02024	800.9	0.0064
2. G-BHC (LINDANE)	0.01235	488.7	0.0091
3. DIELDRIN	0.03352	1326.4	0.0050
4. ENDOSULFAN SULFATE	0.04425	1751.0	0.0046
5. HEPTACHLOR EPOXIDE	0.01567	613.8	0.0076

(SOLVENT SAFETY INFO. ON ATTACHED PG.)

COMPOUND	CAS	OSHA PEL(TWA)	LD50
1. ALDRIN	00309-00-2	0.25MG/M3(SKIN)	ORL-RAT 39MG/KG
2. G-BHC (LINDANE)	00058-89-9	0.5MG/M3 (SKIN)	ORL-RAT 76MG/KG
3. DIELDRIN	00060-57-1	0.25MG/M3 (SKIN)	ORL-RAT 38300(MICRO)G/KG
4. ENDOSULFAN SULFATE	01031-07-8	N/A	ORL-RAT 18MG/KG
5. HEPTACHLOR EPOXIDE	01024-57-3	N/A	ORL-RAT 47MG/KG

P#95142 L#061008.XLS

REV: 2

DATE ISSUED: 07272006

PRINTED ON: 6/11/08

WESTERN ELECTROCHEMICAL
AMMONIUM PERCHLORATE Revised: 04/06/2004

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WESTERN ELECTROCHEMICAL CO.
P.O. BOX 629
10622 WEST 6400 NORTH
CEDAR CITY, UT 84721
TELEPHONE: (435)865-5000
FAX: (435)865-5005

24 HOUR EMERGENCY PHONE: (435)865-5044

AMMONIUM PERCHLORATE

DATE ISSUED: JANUARY 3, 2001

DATE REVISED: APRIL 6, 2004

MATERIAL SAFETY DATA SHEET

SECTION I-PRODUCT IDENTIFICATION

CHEMICAL NAME: AMMONIUM PERCHLORATE

COMMON NAME: AP

CHEMICAL FORMULA: NH_4ClO_4

HMIS:
HEALTH - 1
FIRE - 0
REACTIVITY - 2

SECTION II-HEALTH HAZARD INFORMATION AND FIRST AID PROCEDURES

ACUTE EFFECTS:
MODERATELY TOXIC BY INGESTION AND PARENTERAL ROUTES (INJECTION).

TOXICITY DATA:
RAT-ORAL LD50 = 4200 MG/KG
RAT-PAR-LDLO = 3500 MG/KG
RABBIT-ORAL LD50 = 1900 MG/KG
RABBIT-PAR-LDLO = 750 MG/KG

CHRONIC EFFECTS:
NO LONG-TERM HEALTH EFFECTS HAVE BEEN REPORTED. STUDIES HAVE SHOWN THAT PERCHLORATE INHIBITS IODINE UPTAKE IN THE THYROID GLAND. EPA IS CONDUCTING A RISK ASSESSMENT TO ESTABLISH A MAXIMUM CONCENTRATION LIMIT GOAL FOR DRINKING WATER. STUDIES CONDUCTED OCCUPATIONALLY HAVE INDICATED NO ADVERSE HEALTH EFFECTS ON WORKERS EXPOSED FOR YEARS TO PERCHLORATE. MINIMIZE DUSTING AND USE RESPIRATORY PROTECTION FOR ENVIRONMENTS WHERE SUBSTANTIAL DUST IS GENERATED. OVEREXPOSURE MAY RESULT IN LIMITING IODINE UPTAKE BY THE THYROID AND DEVELOPMENT OF GOITER.

CARCINOGEN:
IARC: NO
NTP: NO

OSHA: NO

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
EXCESSIVE DUST INHALATION CAN AGGRAVATE RESPIRATORY CONDITIONS.

EMERGENCY FIRST AID PROCEDURES:

ROUTES OF EXPOSURE	SIGNS AND SYMPTOMS OF EXPOSURE	EMERGENCY AND FIRST AID PROCEDURES
SKIN:	MAY CAUSE LOCAL IRRITATION OR STINGING EFFECT.	WASH EXPOSED AREA IMMEDIATELY WITH PLENTY OF WATER. REMOVE CONTAMINATED CLOTHING AND FOOTWEAR.
INHALATION:	AIRBORNE CONCENTRATIONS OF AMMONIUM PERCHLORATE CAN AGGRAVATE PRE-EXISTING RESPIRATORY PROBLEMS.	IF EXPERIENCING BREATHING DIFFICULTIES, MOVE TO FRESH AIR. ADMINISTER OXYGEN IF EXPOSED PERSON IS UNCONSCIOUS. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.
INGESTION:	INGESTION OF LARGE QUANTITIES HAS RESULTED IN ATAXIA IN SMALL MAMMALS.	GIVE WATER. INDUCE VOMITING, KEEP AIRWAY CLEAR. SEEK MEDICAL ATTENTION.
EYES:	IRRITATION OF THE EYES WILL CAUSE STINGING EFFECT.	FLUSH EYES WITH FRESH WATER FOR AT LEAST 15 MINUTES AND MOVE EXPOSED PERSON TO A NON-CONTAMINATED AREA.

SECTION III-HAZARDOUS COMPONENTS AND OCCUPATIONAL

		EXPOSURE LIMITS	
HAZARDOUS COMPONENTS	CAS	OSHA PEL TWA	ACGIH TWA
AMMONIUM PERCHLORATE	7790-98-9	15 MG/M3 (NUISANCE DUST)	10 MG/M3 (NUISANCE DUST)

SECTION IV-PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: N/A

VAPOR PRESSURE: N/A

VAPOR DENSITY: N/A

SPECIFIC GRAVITY (H2O=1): 1.95

MELTING POINT: DECOMPOSES AT 270 TO 300 DEG. C

EVAPORATION RATE: N/A

SOLUBILITY IN WATER: 20.8 G/100 ML AT 20 DEG. C

APPEARANCE AND ODOR: WHITE CRYSTAL, NO ODOR.

SECTION V-FIRE AND EXPLOSION DATA

FLASH POINT (METHOD USED): N/A

FLAMMABLE LIMITS:
LEL: N/A
UEL: N/A

EXTINGUISHING MEDIA: WATER

SPECIAL FIRE FIGHTING PROCEDURES:
DO NOT FIGHT FIRES INVOLVING MIXTURES OF AMMONIUM PERCHLORATE AND FUELS. AMMONIUM PERCHLORATE IS AN OXIDIZING AGENT AND MAY CAUSE RAPID COMBUSTION OR EXPLOSIONS IF MIXED WITH FUELS. BURNING AMMONIUM PERCHLORATE PRODUCES CHLORINE AND CHLORINE DIOXIDE. KEEP UPWIND OR WEAR SELF-CONTAINED BREATHING APPARATUS WHEN ATTEMPTING TO RESCUE.

SECTION VI-REACTIVITY DATA

STABILITY:
UNSTABLE: ( )
STABLE: (X)

CONDITIONS TO AVOID:
DO NOT MIX WITH REDUCING AGENTS, METAL POWDERS OR POWDERED CARBON. AVOID ELEVATED TEMPERATURES OVER 270 DEG. C, WHICH CAN CAUSE SPONTANEOUS EXOTHERMIC DECOMPOSITION. CLOTH FABRIC SUCH AS DUST COLLECTOR BAGS INTIMATELY CONTAMINATED WITH AMMONIUM PERCHLORATE IS SUBJECT TO IGNITION THROUGH FRICTION OR IMPACT. HIGH-ENERGY STATIC ELECTRICITY MAY ALSO SERVE AS AN IGNITION SOURCE.

INCOMPATIBILITY (MATERIALS TO AVOID):
SULFURIC ACID, POWDERED METALS, AND INTIMATE MIXTURES WITH ORGANICS.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: CHLORINE AND CHLORINE DIOXIDE.

HAZARDOUS POLYMERIZATION: HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII-ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
SWEEP UP MATERIAL AND CONTAINERIZE. CLEAN CONTAMINATED FLOOR SURFACE WITH WATER.

WASTE DISPOSAL METHOD:
DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

SECTION VIII-SPECIAL PROTECTION/EXPOSURE CONTROL MEASURES

VENTILATION REQUIREMENTS:
VENTILATE AS NECESSARY TO MINIMIZE EXPOSURE LEVELS. INSPECT AND CLEAN VENTILATION SYSTEMS REGULARLY.

EYE PROTECTION: WEAR SAFETY GLASSES.

PROTECTIVE GLOVES:
PLASTIC, RUBBER OR LATEX GLOVES ARE RECOMMENDED.
LEATHER OR COTTON GLOVES SHOULD NOT BE USED.

RESPIRATORY PROTECTION:
NONE GENERALLY REQUIRED. PROTECT FROM NUISANCE DUST, IF NECESSARY DURING HANDLING OR USAGE.

OTHER CLOTHING AND EQUIPMENT:
WEAR IMPERVIOUS APRONS OR RAIN GEAR TO REDUCE CONTAMINATION OF COTTON OR OTHER FIBER CLOTHING.

PERSONAL HYGIENE AND WORK PRACTICES:
AVOID CONTAMINATION OF COTTON OR OTHER ABSORBENT MATERIAL. DO NOT WEAR ANY WORK CLOTHING THAT HAS BECOME CONTAMINATED WITH AMMONIUM PERCHLORATE. REMOVE CONTAMINATED CLOTHING IMMEDIATELY AND KEEP WET UNTIL THOROUGHLY WASHED. SHOWERING IS RECOMMENDED AFTER HANDLING ANY INDUSTRIAL CHEMICAL.

SECTION IX-PRECAUTIONS FOR SAFE HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

STORE AWAY FROM COMBUSTIBLES AND FLAMMABLES. KEEP CONTAINER CLOSED WHEN NOT IN USE. CONTROL STATIC ELECTRICITY AND OTHER IGNITION SOURCES. STORE IN DRY AREAS AWAY FROM SOURCES OF EXTREME HEAT.

SPECIAL MIXING AND HANDLING INSTRUCTIONS:
GROUND AND BOND PROCESS EQUIPMENT. MIXING AMMONIUM PERCHLORATE WITH FUELS OF ANY TYPE MAY RESULT IN RAPID COMBUSTION OR EXPLOSIONS. WHEN HANDLING MATERIALS CONTAMINATED WITH AMMONIUM PERCHLORATE SUCH AS DUST COLLECTOR BAGS OR ANY OTHER COMBUSTIBLE MATERIAL, THOROUGHLY WET THE BAGS WITH WATER BEFORE HANDLING, KEEP THE BAGS WET WHILE HANDLING, AND USE NON-SPARKING TOOLS OR TOOLS COATED WITH NON-SPARKING MATERIAL IF NON-SPARKING TOOLS ARE NOT AVAILABLE. AVOID FRICTION, IMPACT, OR STATIC ELECTRICITY IGNITION SOURCES WHEN ORGANIC MATERIALS ARE CONTAMINATED WITH AMMONIUM PERCHLORATE. FIRE RESISTANT FABRICS DO NOT REDUCE THE HAZARD.

SECTION X-TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOT SHIPPING NAME: AMMONIUM PERCHLORATE

UN NUMBER: 1442

DOT HAZARD CLASS: OXIDIZER 5.1

CAS NUMBER: 7790-98-9

NOTE:
AMPAC, THE PARENT OF WESTERN ELECTROCHEMICAL COMPANY HAS PERFORMED TESTS AS REQUIRED AND APPLIED TO DOT AND RECEIVED APPROVALS LISTED AT THE RIGHT FOR VARIOUS GRADES OF AP AS 5.1 OXIDIZER AS SHOWN TO THE RIGHT. OTHER AP DOES NOT AUTOMATICALLY MEET THIS CLASSIFICATION AND WOULD REQUIRE TESTING AND DOT APPROVAL TO ACHIEVE A 5.1 OXIDIZER CLASS AS COVERED IN 49CFR172 HAZARDOUS MATERIALS TABLE WITH SPECIAL PROVISION 107 FOR AMMONIUM PERCHLORATE AND SUBSEQUENT INFORMATION COVERED IN NOTE 107 AT 49 CFR172.102. THIS REQUIREMENT IS SUPPLEMENTED BY 49 CFR173.57 AND 173.58 AS DESCRIBED IN NOTE 107. THESE EXEMPTIONS ARE SPECIFIC TO THE FACILITY LOCATED AT 10622 WEST 6400 NORTH, CEDAR CITY, UTAH 84720

AMMONIUM PERCHLORATE PROPELLANT GRADE 170 MICRON AND GREATER HAS RECEIVED CLASSIFICATION AS A 5.1 OXIDIZER UNDER EX 2003110036.

AMMONIUM PERCHLORATE PROPELLANT GRADE WITH AVERAGE PARTICLE SIZE OF 70 MICRONS AND LARGER

AMMONIUM PERCHLORATE WETTED WITH NOT LESS THAN 5% WATER HAS RECEIVED CLASSIFICATION AS A 5.1 OXIDIZER UNDER EX2004020234

BOTH EXEMPTIONS HAVE CONTAINER AND WEIGHT RESTRICTIONS AND ARE NOT DIRECTLY TRANSFERABLE TO ANY OTHER PARTIES WITHOUT APPLICATION TO AND APPROVAL OF DOT THROUGH THE RSPA OFFICE.

CAS = CHEMICAL ABSTRACT SERVICE NUMBER
TWA = 8-HOUR TIME WEIGHTED AVERAGE
PEL = OSHA PERMISSIBLE EXPOSURE LIMIT
N/A = NOT APPLICABLE

IMPORTANT:
THE INFORMATION PRESENTED HEREIN, WHILE NOT GUARANTEED, WAS PREPARED BY COMPETENT TECHNICAL PERSONNEL AND IS TRUE AND ACCURATE TO THE BEST OF OUR KNOWLEDGE. NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. THIS INFORMATION IS NOT INTENDED TO BE ALL-INCLUSIVE AS TO THE MANNER AND CONDITIONS OF USE, HANDLING AND STORAGE. OTHER FACTORS MAY INVOLVE OTHER OR ADDITIONAL SAFETY OR PERFORMANCE CONSIDERATIONS. WHILE OUR TECHNICAL PERSONNEL WILL BE HAPPY TO RESPOND TO QUESTIONS REGARDING SAFE HANDLING AND USE PROCEDURES, SAFE HANDLING AND USE REMAINS THE RESPONSIBILITY OF THE CUSTOMER. NO SUGGESTIONS FOR USE ARE INTENDED AS, AND NOTHING HEREIN SHALL BE CONSTRUED AS A RECOMMENDATION TO INFRINGE ANY EXISTING PATENTS OR VIOLATE ANY FEDERAL, STATE OR LOCAL LAWS.

FORM: W-MS-01

DOC ID: 960113

REV: 07

REVISION DATE: APRIL 6, 2004

MATERIAL SAFETY DATA SHEET-AMMONIUM PERCHLORATE

A&K PETRO-CHEM CANADA
HYDROCHLORIC ACID Revised: 06/13/2007

MSDS Contents

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MSDS

A & K PETROCHEM INDUSTRIES LTD.
316 EDGELEY BLVD.
CONCORD, ONTARIO, L4K 3Y3

TELEPHONE:
TORONTO: (416) 213-5611

CONCORD:
FAX: (905) 660-0773

EMERGENCY NUMBERS:
CANUTEC: (613) 996-6666
POISON CONTROL CENTRE: 598-5900

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

PRODUCT NAME: HYDROCHLORIC ACID

CHEMICAL NAME: HYDROCHLORIC ACID

SYNONYMS: MURIATIC ACID, HYDROGEN CHLORIDE SOLUTION

CHEMICAL FAMILY: INORGANIC ACIDS, MINERAL ACIDS

MOLECULAR FORMULA: HCl IN H2O

HAZARDOUS INGREDIENTS OF MATERIALS

NAME	%	LD50 (OR LC50)	TLV/TWA (MG/M3)	CAS NO.
HYDROCHLORIC ACID	30-40	ORAL, RAT = 900 MG/KG	7 (5 PPM)	7647-01-0

PHYSICAL PROPERTIES

APPEARANCE AND ODOR: CLEAR, COLORLESS LIQUID WITH HYDROGEN CHLORIDE ODOR.

BOILING POINT/RANGE: 149 C

MELTING/FREEZING POINT: -25 C

VAPOR PRESSURE: NOT APPLICABLE

SPECIFIC GRAVITY: 1.18

VAPOR DENSITY: NOT APPLICABLE

EVAPORATION RATE: NOT APPLICABLE

SOLUBILITY: MISCIBLE IN ALL PROPORTIONS

% VOLATILE BY VOLUME: 100 (@ 21 C)

pH: 1.0 (0.1 M SOLN)

FIRST AID PROCEDURES

INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION.

CONTACT WITH SKINS:
FLUSH AFFECTED AREA WITH RUNNING WATER FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES.

CONTACT WITH EYES: FLUSH EYES WITH RUNNING WATER FOR AT LEAST 15 MINUTES.

INGESTION:
DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.

OTHER MEDICAL CARE: CALL A PHYSICIAN

REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

CONDITIONS TO AVOID: HIGH TEMPERATURES

MATERIALS TO AVOID:
STRONG BASES, MOST COMMON METALS, AMINES, CARBONATES, SULFURIC ACID, CHLOROSULFONIC ACID, METAL OXIDES.

HAZARDOUS DECOMPOSITION OR COMBUSTION PRODUCTS:
HYDROGEN CHLORIDE, HYDROGEN CHLORINE

FIRE AND EXPLOSION DATA

FLASH POINT (METHOD): NON-FLAMMABLE

AUTOIGNITION POINT: NOT APPLICABLE

FLAMMABILITY LIMITS IN AIR:
UEL (%): NOT APPLICABLE
LEL (%): NOT APPLICABLE

FIRE EXTINGUISHING MEDIA: USE APPROPRIATE MEDIA TO EXTINGUISH SURROUNDING FIRE.

FIRE FIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

OTHER FIRE OR EXPLOSION HAZARDS:
REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR. PRODUCES HYDROGEN CHLORIDE AND HYDROGEN GASES.

TOXICOLOGICAL AND HEALTH DATA

RECOMMENDED EXPOSURE LIMIT (ACGIH TLV-TWA):
TLV: 7 MG/M3 (5 PPM)
PEL: 7 MG/M3 (5 PPM)
THERE IS NO STEL VALUE.

TOXICOLOGICAL DATA:
LD50 (ORAL, RABBIT): 900 MG/KG
LD50 (IPR, MOUSE): 40 MG/KG

LC50 (INHL-RAT-1H): 3124 PPM.

CARCINOGENICITY DATA:
THE INGREDIENTS OF THIS PRODUCT ARE NOT LISTED AS CARCINOGENS BY NTP (NATIONAL TOXICOLOGY PROGRAM) NOR THE Z-LIST, NOT REGULATED AS CARCINOGENS BY OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION), AND HAVE NOT BEEN EVALUATED BY IARC (INTERNATIONAL AGENCY FOR RESEARCH ON CANCER), OR ACGIH (AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS).

REPRODUCTIVE EFFECTS:
NO INFORMATION IS AVAILABLE AND NO ADVERSE REPRODUCTIVE EFFECTS ARE ANTICIPATED.

MUTAGENICITY DATA:
NO INFORMATION IS AVAILABLE AND NO ADVERSE MUTAGENIC EFFECTS ARE ANTICIPATED.

TERATOGENICITY DATA:
NO INFORMATION IS AVAILABLE AND NO ADVERSE TERATOGENIC EFFECTS ARE ANTICIPATED.

SYNERGISTIC MATERIALS: NONE KNOWN

EFFECTS OF EXPOSURE FROM:

INHALATION:
INHALATION OF VAPORS MAY CAUSE COUGHING AND DIFFICULT BREATHING, PULMONARY EDEMA, CIRCULATORY SYSTEM COLLAPSE, DAMAGE TO UPPER RESPIRATORY SYSTEM, AND COLLAPSE.

SKIN CONTACT: LIQUID MAY CAUSE SEVERE BURNS.

EYE CONTACT: LIQUID MAY CAUSE SEVERE BURNS.

INGESTION:
IS HARMFUL AND EVEN FATAL, MAY CAUSE SEVERE BURNS OF THE MOUTH, THROAT, AND STOMACH, NAUSEA, AND VOMITING.

OTHER HEALTH EFFECTS:
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE IDENTIFIED.

PREVENTATIVE MEASURES

ENGINEERING CONTROLS: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV

RESPIRATORY PROTECTION:
AT CONCENTRATIONS UP TO 100 PPM, USE CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE DESIGNATED.

SKIN PROTECTION:
WEAR NEOPRENE GLOVES, PROTECTIVE UNIFORM/APRON ALONG WITH NEOPRENE BOOTS DESIGNATED FOR ACID RESISTANCE.

EYE PROTECTION: SAFETY GOGGLES WITH SIDE PANELS PLUS FULL FACE SHIELD.

OTHER PERSONAL PROTECTIVE EQUIPMENT:
SAFETY SHOWER, EYE BATH AND WASHING FACILITIES SHOULD BE CLOSE BY.

HANDLING PROCEDURES AND EQUIPMENT:
THE USUAL EQUIPMENT ASSOCIATED WITH CORROSIVE ACIDS

STORAGE REQUIREMENTS:
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA. ISOLATE FROM INCOMPATIBLE MATERIALS.

OTHER PRECAUTIONS: NOT APPLICABLE

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR LEAK:

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

ENVIRONMENTAL EFFECTS: NOT APPLICABLE

DEACTIVATING CHEMICALS: NOT APPLICABLE

WASTE DISPOSAL METHODS:
CONSULT FEDERAL, PROVINCIAL, STATE, AND LOCAL REGULATIONS ON CHEMICAL WASTE DISPOSAL.

TDG: SHIPPING INFORMATION

SHIPPING NAME: HYDROCHLORIC ACID SOLUTION

SHIPPING CLASS: 8

UN: 1789

PACKING GROUP: II

WHMIS CLASS: D1A, E

DATE ISSUED: FEBRUARY 3, 1989

DATE REVISED: JUNE 13, 2007

PREPARED BY: THOMAS KYRON

MSDS INDEX NO.:

THE INFORMATION SET FORTH HEREIN HAS BEEN GATHERED FROM STANDARD REFERENCE MATERIALS AND/OR A & K PETROCHEM INDUSTRIES LTD TEST DATA AND IS TO THE BEST KNOWLEDGE AND BELIEF OF A & K PETROCHEM INDUSTRIES LTD ACCURATE AND RELIABLE. SUCH INFORMATION IS OFFERED SAFETY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION, AND IT IS NOT SUGGESTED OR GUARANTEED THAT THE HAZARD PRECAUTIONS OR PROCEDURES MENTIONED ARE THE ONLY ONES WHICH EXIST. A & K PETROCHEM INDUSTRIES LTD MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE USE OF SUCH INFORMATION OR THE USE OF THE SPECIFIC MATERIAL IDENTIFIED HEREIN IN COMBINATION WITH ANY OTHER MATERIAL OR PROCESS, AND ASSUMES NO RESPONSIBILITY THEREFORE.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- ❏ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- ❏ When lead is released to the air, it may travel long distances before settling to the ground.
- ❏ Once lead falls onto soil, it usually sticks to soil particles.
- ❏ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- ❏ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
- ❏ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- ❏ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- ❏ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

❑ Avoid exposure to sources of lead.

❑ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.

❑ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❑ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❑ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (μg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 μg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

MERCURY
CAS # 7439-97-6

Agency for Toxic Substances and Disease Registry ToxFAQs **April 1999**

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mŭr′kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.
- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ABSOLUTE STANDARDS
METHYLENE CHLORIDE Revised: 01/01/2004

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SECTION VIII - CONTROL MEASURES

ABSOLUTE STANDARDS INC.
PO BOX 5585
HAMDEN, CT 06518-0585

PHONE: 203-281-2917

FAX: 203-281-2922

MATERIAL SAFETY DATA SHEET (MSDS)

MAY BE USED TO COMPLY WITH OSHA'S HAZARD COMMUNICATION STANDARD
29 CFR 1910.1200., SECTION (G)(C)(1).

STANDARD MUST BE CONSULTED FOR SPECIFIC REQUIREMENTS.

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
(NON-MANDATORY FORM)

FORM APPROVED
OMB NO.: 1218-0072

CONTACT NAME BELOW FOR FURTHER INFORMATION.

IDENTITY:
METHYLENE CHLORIDE
CAS #: 00075-09-2

NOTE:
BLANK SPACES ARE NOT PERMITTED. IF ANY ITEM IS NOT APPLICABLE, OR NO INFORMATION IS AVAILABLE, THE SPACE MUST BE MARKED TO INDICATE THAT.

SECTION I

MANUFACTURER'S NAME: ABSOLUTE STANDARDS INC

ADDRESS (NUMBER, STREET, CITY, STATE, AND ZIP CODE):
44 ROSSOTTO DR.
HAMDEN CT, 06514

EMERGENCY TELEPHONE NUMBER: 1-203-281-2917

TELEPHONE NUMBER FOR INFORMATION: 1-203-281-2917

DATE PREPARED/REVISED: 1/1/04

SIGNATURE OF PREPARATOR (OPTIONAL): JACK CRISCIO

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS (SPECIFIC CHEMICAL IDENTITY; COMMON NAME(S))	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED	% (OPTIONAL)
METHYLENE CHLORIDE DICHLOROMETHANE	25 PPM	350 MG/M3	NA	>97

SEE ATTACHED CERTIFIED WEIGHT REPORT FOR OTHER ANALYTES PRESENT AT TRACE QUANTITIES.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 40 DEG. C

SPECIFIC GRAVITY (H2O = 1): 1.32

VAPOR PRESSURE (MMHg): 350

MELTING POINT: -95 DEG. C

VAPOR DENSITY (AIR = 1): 2.9

EVAPORATION RATE (BUTYL ACETATE = 1): 27.5

SOLUBILITY IN WATER: MODERATE (1-10%)

APPEARANCE AND ODOR:
CLEAR, COLORLESS LIQUID WITH CHARACTERISTIC PENETRATING ETHER-LIKE ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) (CLOSED CUP): NA

FLAMMABLE LIMITS:
LEL: 12%
UEL: 19%

EXTINGUISHING MEDIA: USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIREFIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
VAPOR MAY FORM FLAMMABLE MIXTURE IN ATMOSPHERE THAT CONTAINS A HIGH PERCENTAGE OF OXYGEN. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. BURNS WITH A CLEAR, ALMOST INVISIBLE FLAME. CONCENTRATED VAPOR CAN BE IGNITED BY A HIGH INTENSITY IGNITION SOURCE.

TOXIC GASES PRODUCED MAY INCLUDE:
HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE.

SECTION V - REACTIVITY DATA

STABILITY:
UNSTABLE ( )
STABLE (X)

CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID):
STRONG OXIDIZING AGENTS, STRONG ACIDS, ZINC, ALUMINUM, MAGNESIUM

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:
CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

HAZARDOUS POLYMERIZATION:
MAY OCCUR ( )
WILL NOT OCCUR (X)

CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY:
INHALATION?: YES
SKIN?: YES
INGESTION?: YES

HEALTH HAZARDS (ACUTE AND CHRONIC):
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE, LUNGS, BLOOD, OR CENTRAL NERVOUS SYSTEM.

CARCINOGENICITY:
NTP?: NO
IARC MONOGRAPHS?: YES
OSHA REGULATED?: NO

SIGNS AND SYMPTOMS OF EXPOSURE:
INHALATION AND INGESTION ARE HARMFUL AND MAY BE FATAL. INHALATION AND INGESTION MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, SUFFOCATION, LOWER BLOOD PRESSURE, CENTRAL NERVOUS SYSTEM DEPRESSION. CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION. PROLONGED SKIN MAY RESULT IN DERMATITIS. EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:
EYE DISORDERS, SKIN DISORDERS, LIVER OR KIDNEY DISORDERS, CARDIOVASCULAR DISORDERS, HEART DISORDERS, CENTRAL NERVOUS SYSTEM DISORDERS, HEAVY DRINKERS, AND HEAVY SMOKERS.

EMERGENCY AND FIRST AID PROCEDURE:
CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE REUSE.

WARNING:
THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

SHUT OFF IGNITION SOURCES:
NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

WASTE DISPOSAL METHOD:
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINERS TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

OTHER PRECAUTIONS:
USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
STORAGE COLOR CODE BLUE HEALTH.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE):
RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 125 PPM, A SELF CONTAINED BREATHING APPARATUS IS ADVISED.

VENTILATION:
LOCAL EXHAUST:
MECHANICAL (GENERAL): YES
SPECIAL: NA
OTHER: NA

PROTECTIVE GLOVES: YES

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: SAFETY GOGGLES

WORK/HYGIENIC PRACTICES: GOOD LABORATORY PRACTICES

NOTE:
NA = NOT APPLICABLE OR NOT AVAILABLE.

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THERE UNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY TRAINED PERSONNEL, OR SUPERVISED BY A PERSON TRAINED IN CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, ABSOLUTE STANDARDS INC. CANNOT WARN OF ALL THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR SUBSTANCES. ABSOLUTE STANDARDS INC. WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. ABSOLUTE STANDARDS INC DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR APPLICATION. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY OR DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, ABSOLUTE STANDARDS INC. WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. IF YOU HAVE ANY QUESTIONS, PLEASE CALL TECHNICAL SERVICE AT 1-203-281-2917 FOR ASSISTANCE.

PRINTED: 8/16/04

A&K PETRO-CHEM CANADA
NITRIC ACID Revised: 06/13/2007

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TOXICOLOGICAL AND HEALTH DATA
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MSDS

A & K PETROCHEM INDUSTRIES LTD.
316 EDGELEY BLVD.
CONCORD, ONTARIO, L4K 3Y3

TELEPHONE:
TORONTO: (416) 213-5611

CONCORD:
FAX: (905) 660-0773

EMERGENCY NUMBERS:
CANUTEC: (613) 996-6666
POISON CONTROL CENTRE: 598-5900

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

PRODUCT NAME: NITRIC ACID

CHEMICAL NAME: NITRIC ACID

SYNONYMS: HYDROGEN NITRATE

CHEMICAL FAMILY: MINERAL ACIDS

MOLECULAR FORMULA: HNO3

HAZARDOUS INGREDIENTS OF MATERIALS

NAME	%	LD50 (OR LC50)	TLV/TWA (MG/M3)	CAS NO.
NITRIC ACID	60-100	NOT REPORTED	5 (2 PPM)	7697-37-32

PHYSICAL PROPERTIES

APPEARANCE AND ODOR: COLORLESS LIQUID, WITH CHOKING ODOR

BOILING POINT/RANGE: 120 DEG. C (248 DEG. F)

MELTING/FREEZING POINT: -42 DEG. C (-44 DEG. F)

VAPOR PRESSURE: 2.9

SPECIFIC GRAVITY: 1.50

VAPOR DENSITY: 2.5

EVAPORATION RATE: NOT APPLICABLE

SOLUBILITY: COMPLETE (IN ALL PROPORTIONS)

% VOLATILE BY VOLUME: 100

pH: NOT APPLICABLE

FIRST AID PROCEDURES

INHALATION:
REMOVE TO FRESH AIR AND KEEP WARM AND AT REST. IF BREATHING BECOMES DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION. OBTAIN MEDICAL ATTENTION IMMEDIATELY. EFFECTS OF INHALATION MAY BE DELAYED.

CONTACT WITH SKIN:
PROMPTLY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING. WASH CLOTHING THOROUGHLY BEFORE REUSE. GET MEDICAL ATTENTION IF SKIN IRRITATION PERSISTS.

CONTACT WITH EYES:
IMMEDIATELY FLUSH WITH PLENTY OF WATER, LIFTING EYELIDS OCCASIONALLY TO FACILITATE IRRIGATION AND CONTINUE FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION AT ONCE.

INGESTION:
IF CONSCIOUS, GIVE WATER OR MILK TO DILUTE ACID. DO NOT INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IMMEDIATELY.

OTHER MEDICAL CARE: NOT REPORTED

REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, LIGHT

MATERIALS TO AVOID:
STRONG BASES, COMBUSTIBLE MATERIALS, STRONG REDUCING AGENTS

HAZARDOUS DECOMPOSITION OR COMBUSTION PRODUCTS: OXIDES OF NITROGEN

FIRE AND EXPLOSION DATA

FLASH POINT (METHOD): NOT APPLICABLE

AUTOIGNITION POINT: NOT APPLICABLE

FLAMMABILITY LIMITS IN AIR:
UEL (%): NOT APPLICABLE
LEL (%): NOT APPLICABLE

FIRE EXTINGUISHING MEDIA: USE WATER SPRAY

FIRE FIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

OTHER FIRE OR EXPLOSION HAZARDS:
STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. NITROGEN OXIDES CAN BE PRODUCED.

TOXICOLOGICAL AND HEALTH DATA

RECOMMENDED EXPOSURE:

LIMIT (ACGIH TLV-TWA):
TLV/TWA: 5 MG/M3 (2 PPM)
STEL: 10 MG/M3 (4 PPM).

TOXICOLOGICAL DATA:
LDLO (HUMAN, ORAL): 430 MG/KG

CARCINOGENICITY DATA: NOT AVAILABLE/REPORTED

REPRODUCTIVE EFFECTS: NOT AVAILABLE/REPORTED

MUTAGENICITY DATA: NOT AVAILABLE/REPORTED

TERATOGENICITY DATA: NOT AVAILABLE/REPORTED

SYNERGISTIC MATERIALS: NOT AVAILABLE/REPORTED

EFFECTS OF EXPOSURE FROM:

INHALATION:
MAY CAUSE SEVERE COUGHING, CHEST PAINS, DIFFICULTY BREATHING, IRRITATION OF THE RESPIRATORY SYSTEM, OR UNCONSCIOUSNESS.

SKIN CONTACT: LIQUID MAY CAUSE SEVERE BURNS

EYE CONTACT: LIQUID MAY CAUSE SEVERE BURNS

INGESTION: MAY BE FATAL

OTHER HEALTH EFFECTS: NOT AVAILABLE

PREVENTATIVE MEASURES

ENGINEERING CONTROLS:
USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION:

RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV.

AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

SKIN PROTECTION:
FACE SHIELD, UNIFORM, PROTECTIVE SUIT, ACID RESISTANT GLOVES ARE RECOMMENDED

EYE PROTECTION: SAFETY GOGGLES ARE RECOMMENDED

OTHER PERSONAL PROTECTIVE EQUIPMENT: NOT APPLICABLE

HANDLING PROCEDURES AND EQUIPMENT: NOT APPLICABLE

STORAGE REQUIREMENTS:
KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS.

OTHER PRECAUTIONS: NOT APPLICABLE

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR LEAK:

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME, WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER. KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL.

ENVIRONMENTAL EFFECTS: NOT APPLICABLE

DEACTIVATING CHEMICALS: NOT APPLICABLE

WASTE DISPOSAL METHODS:
DISPOSE OF IN ACCORDANCE WITH FEDERAL, PROVINCIAL, STATE, AND LOCAL REGULATIONS ON CHEMICAL WASTE DISPOSAL.

TDG: SHIPPING INFORMATION

SHIPPING NAME: NITRIC ACID, MORE THAN 70%

SHIPPING CLASS: 8

UN: 2031

PACKING GROUP: I

WHMIS CLASS: C, E, D2

DATE ISSUED: OCTOBER 31, 1988

DATE REVISED: JUNE 13, 2007

PREPARED BY: THOMAS KYRON

MSDS INDEX NO.:

THE INFORMATION SET FORTH HEREIN HAS BEEN GATHERED FROM STANDARD REFERENCE MATERIALS AND/OR A & K PETROCHEM INDUSTRIES LTD TEST DATA AND IS TO THE BEST KNOWLEDGE AND BELIEF OF A & K PETROCHEM INDUSTRIES LTD ACCURATE AND RELIABLE. SUCH INFORMATION IS OFFERED SAFETY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION, AND IT IS NOT SUGGESTED OR GUARANTEED THAT THE HAZARD PRECAUTIONS OR PROCEDURES MENTIONED ARE THE ONLY ONES WHICH EXIST. A & K PETROCHEM INDUSTRIES LTD MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE USE OF SUCH INFORMATION OR THE USE OF THE SPECIFIC MATERIAL IDENTIFIED HEREIN IN COMBINATION WITH ANY OTHER MATERIAL OR PROCESS, AND ASSUMES NO RESPONSIBILITY THEREFORE.

ALFA AESAR
POTASSIUM PERMANGANATE, A12170, L09292 Revised: 08/30/2006

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ALFA AESAR(R*)
A JOHNSON MATTHEY COMPANY

MATERIAL SAFETY DATA SHEET

ACC. TO OSHA AND ANSI

PRINTING DATE: 09/07/2007

REVIEWED ON: 08/30/2006

1 IDENTIFICATION OF SUBSTANCE

PRODUCT DETAILS:

PRODUCT NAME: POTASSIUM PERMANGANATE

STOCK NUMBER:
A12170
L09292

MANUFACTURER/SUPPLIER:
ALFA AESAR
A JOHNSON MATTHEY COMPANY
JOHNSON MATTHEY CATALOG COMPANY, INC.
30 BOND STREET
WARD HILL, MA 01835-8099

EMERGENCY PHONE: (978) 521-6300

CHEMTREC: (800) 424-9300

WEB SITE: WWW.ALFA.COM

INFORMATION DEPARTMENT: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT

EMERGENCY INFORMATION:
DURING NORMAL HOURS THE HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.
AFTER NORMAL HOURS CALL CHEMTREC AT (800) 424-9300.

2 COMPOSITION/DATA ON COMPONENTS

CHEMICAL CHARACTERIZATION:

DESCRIPTION	(CAS#)	
POTASSIUM PERMANGANATE	(CAS# 7722-64-7)	100%

IDENTIFICATION NUMBER(S):

EINECS NUMBER: 231-760-3
EU NUMBER: 025-002-00-9

3 HAZARDS IDENTIFICATION

HAZARD DESCRIPTION:
Xn: HARMFUL
O: OXIDIZING
N: DANGEROUS FOR THE ENVIRONMENT

INFORMATION PERTAINING TO PARTICULAR DANGERS FOR MAN AND ENVIRONMENT:

R 8: CONTACT WITH COMBUSTIBLE MATERIAL MAY CAUSE FIRE.

R 22: HARMFUL IF SWALLOWED.

R 50/53:
VERY TOXIC TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

CLASSIFICATION SYSTEM:

HMIS RATINGS (SCALE 0-4) (HAZARDOUS MATERIALS IDENTIFICATION SYSTEM):
HEALTH 2
FIRE 0
REACTIVITY 2

HEALTH (ACUTE EFFECTS) 2
FLAMMABILITY 0
REACTIVITY 2

4 FIRST AID MEASURES

AFTER INHALATION:
SUPPLY FRESH AIR. IF REQUIRED, PROVIDE ARTIFICIAL RESPIRATION.
KEEP PATIENT WARM.
SEEK IMMEDIATE MEDICAL ADVICE.

AFTER SKIN CONTACT:
IMMEDIATELY WASH WITH WATER AND SOAP AND RINSE THOROUGHLY.
SEEK IMMEDIATE MEDICAL ADVICE.

AFTER EYE CONTACT:
RINSE OPENED EYE FOR SEVERAL MINUTES UNDER RUNNING WATER.
THEN CONSULT A DOCTOR.

AFTER SWALLOWING: SEEK IMMEDIATE MEDICAL ADVICE.

5 FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING AGENTS:
USE CARBON DIOXIDE, EXTINGUISHING POWDER OR FOAM. WATER MAY BE INEFFECTIVE BUT MAY BE USED FOR COOLING EXPOSED CONTAINERS.

SPECIAL HAZARDS CAUSED BY THE MATERIAL, ITS PRODUCTS OF COMBUSTION OR RESULTING GASES:

IN CASE OF FIRE, THE FOLLOWING CAN BE RELEASED:
METAL OXIDE FUME
THIS SUBSTANCE IS AN OXIDIZER AND ITS HEAT OF REACTION WITH REDUCING AGENTS OR COMBUSTIBLES MAY CAUSE IGNITION.

PROTECTIVE EQUIPMENT:
WEAR SELF-CONTAINED RESPIRATOR.
WEAR FULLY PROTECTIVE IMPERVIOUS SUIT.

6 ACCIDENTAL RELEASE MEASURES

PERSON-RELATED SAFETY PRECAUTIONS:
WEAR PROTECTIVE EQUIPMENT. KEEP UNPROTECTED PERSONS AWAY.
ENSURE ADEQUATE VENTILATION

MEASURES FOR ENVIRONMENTAL PROTECTION:
DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER GOVERNMENTAL PERMITS.

MEASURES FOR CLEANING/COLLECTING:
DISPOSE CONTAMINATED MATERIAL AS WASTE ACCORDING TO ITEM 13.

ADDITIONAL INFORMATION:
SEE SECTION 7 FOR INFORMATION ON SAFE HANDLING
SEE SECTION 8 FOR INFORMATION ON PERSONAL PROTECTION EQUIPMENT.
SEE SECTION 13 FOR DISPOSAL INFORMATION.

7 HANDLING AND STORAGE

HANDLING:

INFORMATION FOR SAFE HANDLING:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY PLACE IN TIGHTLY CLOSED CONTAINERS.
ENSURE GOOD VENTILATION AT THE WORKPLACE.

INFORMATION ABOUT PROTECTION AGAINST EXPLOSIONS AND FIRES:
SUBSTANCE/PRODUCT CAN REDUCE THE IGNITION TEMPERATURE OF FLAMMABLE SUBSTANCES.

THIS SUBSTANCE IS AN OXIDIZER AND ITS HEAT OF REACTION WITH REDUCING AGENTS OR COMBUSTIBLES MAY CAUSE IGNITION.

STORAGE:

REQUIREMENTS TO BE MET BY STOREROOMS AND RECEPTACLES:
NO SPECIAL REQUIREMENTS.

INFORMATION ABOUT STORAGE IN ONE COMMON STORAGE FACILITY:
STORE AWAY FROM FLAMMABLE SUBSTANCES.
STORE AWAY FROM REDUCING AGENTS.

FURTHER INFORMATION ABOUT STORAGE CONDITIONS:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY CONDITIONS IN WELL SEALED CONTAINERS.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

ADDITIONAL INFORMATION ABOUT DESIGN OF TECHNICAL SYSTEMS:
PROPERLY OPERATING CHEMICAL FUME HOOD DESIGNED FOR HAZARDOUS CHEMICALS AND HAVING AN AVERAGE FACE VELOCITY OF AT LEAST 100 FEET PER MINUTE.

COMPONENTS WITH LIMIT VALUES THAT REQUIRE MONITORING AT THE WORKPLACE:

MANGANESE, ELEMENTAL & INORGANIC COMPOUNDS (AS Mn):

	MG/M3
ACGIH TLV	0.2
AUSTRIA MAK	5
BELGIUM TWA	5
DENMARK TWA	2.5
FINLAND TWA	0.5
HUNGARY TWA	0.3; 0.6-STEL
GERMANY MAK	0.55
JAPAN OEL	0.3 (RESPIRABLE DUST)
KOREA TLV	0.2

NETHERLANDS MAC-TGG	1; 3-MAC-K
NORWAY TWA	2.5
POLAND TWA	0.3; 5-MAC
RUSSIA	0.2-STEL (FUME)
SWEDEN NGV	1; 2.5-TGV (RESPIRABLE DUST) 2.5; 5-TGV (TOTAL DUST)
UNITED KINGDOM TWA	5
USA PEL	5-CEILING

ADDITIONAL INFORMATION: NO DATA

PERSONAL PROTECTIVE EQUIPMENT:

GENERAL PROTECTIVE AND HYGIENIC MEASURES:
THE USUAL PRECAUTIONARY MEASURES FOR HANDLING CHEMICALS SHOULD BE FOLLOWED.
KEEP AWAY FROM FOODSTUFFS, BEVERAGES AND FEED.
REMOVE ALL SOILED AND CONTAMINATED CLOTHING IMMEDIATELY.
WASH HANDS BEFORE BREAKS AND AT THE END OF WORK.

BREATHING EQUIPMENT:
USE SUITABLE RESPIRATOR WHEN HIGH CONCENTRATIONS ARE PRESENT.

PROTECTION OF HANDS:
IMPERVIOUS GLOVES
CHECK PROTECTIVE GLOVES PRIOR TO EACH USE FOR THEIR PROPER CONDITION.

MATERIAL OF GLOVES:
THE SELECTION OF SUITABLE GLOVES NOT ONLY DEPENDS ON THE MATERIAL,
BUT ALSO ON QUALITY. QUALITY WILL VARY FROM MANUFACTURER TO MANUFACTURER.

EYE PROTECTION: SAFETY GLASSES

BODY PROTECTION: PROTECTIVE WORK CLOTHING.

9 PHYSICAL AND CHEMICAL PROPERTIES

GENERAL INFORMATION:
FORM: CRYSTALLINE
COLOR: VIOLET
ODOR: ODORLESS

CHANGE IN CONDITION:
MELTING POINT/MELTING RANGE: NOT DETERMINED
BOILING POINT/BOILING RANGE: NOT DETERMINED

SUBLIMATION TEMPERATURE / START: NOT DETERMINED

FLASH POINT: NOT APPLICABLE

FLAMMABILITY (SOLID, GASEOUS):
CONTACT WITH COMBUSTIBLE MATERIAL MAY CAUSE FIRE.

IGNITION TEMPERATURE: NOT DETERMINED

DECOMPOSITION TEMPERATURE: NOT DETERMINED

EXPLOSION LIMITS:
LOWER: NOT DETERMINED
UPPER: NOT DETERMINED

VAPOR PRESSURE: NOT DETERMINED

DENSITY AT 20 DEG. C (68 DEG. F): 2.703 G/CM3

SOLUBILITY IN / MISCIBILITY WITH WATER: SOLUBLE

10 STABILITY AND REACTIVITY

THERMAL DECOMPOSITION / CONDITIONS TO BE AVOIDED:
DECOMPOSITION WILL NOT OCCUR IF USED AND STORED ACCORDING TO SPECIFICATIONS.

MATERIALS TO BE AVOIDED: REDUCING AGENTS

DANGEROUS REACTIONS:
REACTS WITH REDUCING AGENTS
REACTS WITH FLAMMABLE SUBSTANCES

DANGEROUS PRODUCTS OF DECOMPOSITION: METAL OXIDE FUME

11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

LD/LC50 VALUES THAT ARE RELEVANT FOR CLASSIFICATION:

ORAL:
LD50:
1151 MG/KG (GPG)
2157 MG/KG (MUS)
750 MG/KG (RAT)

LDLO:
400 MG/KG (DOG)
143 MG/KG (HMN)
600 GM/KG (RBT)
100 MG/KG (WMN)

PRIMARY IRRITANT EFFECT:
ON THE SKIN: IRRITANT TO SKIN AND MUCOUS MEMBRANES.
ON THE EYE: IRRITATING EFFECT.

SENSITIZATION: NO SENSITIZING EFFECTS KNOWN.

OTHER INFORMATION (ABOUT EXPERIMENTAL TOXICOLOGY):
REPRODUCTIVE EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH BACTERIA.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.

SUBACUTE TO CHRONIC TOXICITY:
CHRONIC EXPOSURE TO MANGANESE MAY CAUSE IMPAIRMENT TO THE CENTRAL NERVOUS SYSTEM. SYMPTOMS INCLUDE SLUGGISHNESS, SLEEPINESS, MUSCLE WEAKNESS, LOSS OF FACIAL MUSCLE CONTROL, EDEMA, EMOTIONAL DISTURBANCES, SPASTIC GAIT AND FALLING.

SUBACUTE TO CHRONIC TOXICITY:

THE REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) REPORTS THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:

GASTROINTESTINAL - NAUSEA OR VOMITING.

GASTROINTESTINAL - OTHER CHANGES.

BEHAVIORAL - SOMNOLENCE (GENERAL DEPRESSED ACTIVITY).

BEHAVIORAL - ALTERATION OF CLASSICAL CONDITIONING.

BLOOD - CHANGES IN SERUM COMPOSITION (E.G. TP, BILIRUBIN, CHOLESTEROL).

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - TRUE CHOLINESTERASE.

VASCULAR - BP LOWERING NOT CHARACTERIZED IN AUTONOMIC SECTION.

LIVER - HEPATITIS (HEPATOCELLULAR NECROSIS), DIFFUSE KIDNEY, URETER, BLADDER - CHANGES IN TUBULES (INCLUDING ACUTE RENAL FAILURE, ACUTE TUBULAR NECROSIS).

LUNGS, THORAX, OR RESPIRATION - DYSPNEA.

REPRODUCTIVE - FERTILITY - MALE FERTILITY INDEX (E.G. # MALES IMPREGNATING FEMALES PER # MALES EXPOSED TO FERTILE NONPREGNANT FEMALES)

REPRODUCTIVE - PATERNAL EFFECTS - SPERMATOGENESIS (INCLUDING GENETIC MATERIAL, SPERM MORPHOLOGY, MOTILITY, AND COUNT).

ADDITIONAL TOXICOLOGICAL INFORMATION:
TO THE BEST OF OUR KNOWLEDGE THE ACUTE AND CHRONIC TOXICITY OF THIS SUBSTANCE IS NOT FULLY KNOWN.

EPA-D:
NOT CLASSIFIABLE AS TO HUMAN CARCINOGENICITY:
INADEQUATE HUMAN AND ANIMAL EVIDENCE OF CARCINOGENICITY OR NO DATA ARE AVAILABLE.

12 ECOLOGICAL INFORMATION

ECOTOXICAL EFFECTS:

REMARK: VERY TOXIC FOR FISH

GENERAL NOTES:
DO NOT ALLOW PRODUCT TO REACH GROUND WATER, WATER COURSE OR SEWAGE SYSTEM, EVEN IN SMALL QUANTITIES.

DANGER TO DRINKING WATER IF EVEN EXTREMELY SMALL QUANTITIES LEAK INTO THE GROUND.

ALSO POISONOUS FOR FISH AND PLANKTON IN WATER BODIES.

DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER GOVERNMENTAL PERMITS.

VERY TOXIC FOR AQUATIC ORGANISMS

13 DISPOSAL CONSIDERATIONS

PRODUCT:

RECOMMENDATION:
CONSULT STATE, LOCAL OR NATIONAL REGULATIONS TO ENSURE PROPER DISPOSAL.

UNCLEANED PACKAGINGS:

RECOMMENDATION: DISPOSAL MUST BE MADE ACCORDING TO OFFICIAL REGULATIONS.

RECOMMENDED CLEANSING AGENT: WATER, IF NECESSARY WITH CLEANSING AGENTS.

14 TRANSPORT INFORMATION

DOT REGULATIONS:
HAZARD CLASS: 5.1
IDENTIFICATION NUMBER: UN1490
PACKING GROUP: II
HAZARDOUS SUBSTANCE: 100 LBS, 45.4 KG
PROPER SHIPPING NAME (TECHNICAL NAME): POTASSIUM PERMANGANATE
LABEL: 5.1

LAND TRANSPORT ADR/RID (CROSS-BORDER):
ADR/RID CLASS: 5.1 (O2) OXIDIZING SUBSTANCES
DANGER CODE (KEMLER): 50
UN-NUMBER: 1490
PACKAGING GROUP: II
DESCRIPTION OF GOODS: 1490 POTASSIUM PERMANGANATE

MARITIME TRANSPORT IMDG:
IMDG CLASS: 5.1
UN NUMBER: 1490
LABEL 5.1
PACKAGING GROUP: II
PROPER SHIPPING NAME: POTASSIUM PERMANGANATE

AIR TRANSPORT ICAO-TI AND IATA-DGR:
ICAO/IATA CLASS: 5.1
UN/ID NUMBER: 1490
LABEL: 5.1

PACKAGING GROUP: II
PROPER SHIPPING NAME: POTASSIUM PERMANGANATE

15 REGULATIONS

PRODUCT RELATED HAZARD INFORMATIONS:

HAZARD SYMBOLS:
Xn: HARMFUL
O: OXIDIZING
N: DANGEROUS FOR THE ENVIRONMENT

RISK PHRASES:

8: CONTACT WITH COMBUSTIBLE MATERIAL MAY CAUSE FIRE.

22: HARMFUL IF SWALLOWED.

50/53:
VERY TOXIC TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

SAFETY PHRASES:

60: THIS MATERIAL AND ITS CONTAINER MUST BE DISPOSED OF AS HAZARDOUS WASTE.

61:
AVOID RELEASE TO THE ENVIRONMENT. REFER TO SPECIAL INSTRUCTIONS/SAFETY DATA SHEETS

NATIONAL REGULATIONS:
ALL COMPONENTS OF THIS PRODUCT ARE LISTED IN THE U.S. ENVIRONMENTAL PROTECTION AGENCY TOXIC SUBSTANCES CONTROL ACT CHEMICAL SUBSTANCE INVENTORY.

ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE CANADIAN DOMESTIC SUBSTANCES LIST (DSL).

INFORMATION ABOUT LIMITATION OF USE:
FOR USE ONLY BY TECHNICALLY QUALIFIED INDIVIDUALS. THIS PRODUCT CONTAINS MANGANESE AND IS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372.

16 OTHER INFORMATION

EMPLOYERS SHOULD USE THIS INFORMATION ONLY AS A SUPPLEMENT TO OTHER INFORMATION GATHERED BY THEM, AND SHOULD MAKE INDEPENDENT JUDGMENT OF SUITABILITY OF THIS INFORMATION TO ENSURE PROPER USE AND PROTECT THE HEALTH AND SAFETY OF EMPLOYEES. THIS INFORMATION IS FURNISHED WITHOUT WARRANTY, AND ANY USE OF THE PRODUCT NOT IN CONFORMANCE WITH THIS MATERIAL SAFETY DATA SHEET, OR IN COMBINATION WITH ANY OTHER PRODUCT OR PROCESS, IS THE RESPONSIBILITY OF THE USER.

DEPARTMENT ISSUING MSDS: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.

CONTACT: PAUL V. CONNOLLY

USA

005810149

00190841

ANACHEMIA CANADA
SODIUM PERSULFATE Revised: 05/23/2008

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MATERIAL SAFETY DATA SHEET

ANACHEMIA
255 NORMAN.
LACHINE (MONTREAL)
QUE H8R 1A3

EMERGENCY NUMBERS:
(USA) CHEMTREC: 1 (800) 424-9300 (24 HRS)
(CAN) CANUTEC: 1 (613) 996-6666 (24 HRS)
(USA) ANACHEMIA: 1 (518) 297-4444
(CAN) ANACHEMIA: 1 (514) 489-5711

WHMIS:

WHMIS CLASS: C D-2A
C - OXIDIZING MATERIAL
D2 - MATERIALS CAUSING OTHER TOXIC EFFECTS

PROTECTIVE CLOTHING:
FACE SHIELD
CHEMICAL GOGGLES
GLOVES
APRON
LAB COAT

TDG ROAD/RAIL:
TDG CLASS: 5.1
PIN: UN1505
PG: III

CLASS 5.1, OXIDIZING SUBSTANCES

SECTION I. PRODUCT IDENTIFICATION AND USES

PRODUCT NAME: SODIUM PERSULFATE

CHEMICAL FORMULA: Na2S2O8

CI#: NOT AVAILABLE.

CAS#: 7775-27-1

CODE: AC-8455

FORMULA WEIGHT: 238.10

SYNONYMS: SODIUM PEROXYDISULFATE, AC-8455, 84410

SUPPLIER:
ANACHEMIA CANADA.
255 NORMAN.
LACHINE (MONTREAL)
QUE H8R 1A3

SUPERSEDES:

MATERIAL USES: FOR LABORATORY USE ONLY.

SECTION II. INGREDIENTS

NAME	CAS #	%	TLV
1) SODIUM PERSULFATE	7775-27-1	99	EXPOSURE LIMITS: ACGIH TWA: 0.1 MG/M3

TOXICITY VALUES OF THE HAZARDOUS INGREDIENTS:

SODIUM PERSULFATE:
INTRAPERITONEAL (LD50):
ACUTE: 226 MG/KG (MOUSE).

SECTION III. PHYSICAL DATA

PHYSICAL STATE AND APPEARANCE / ODOR: SOLID. (WHITE CRYSTALS. ODORLESS.)

pH (1% SOLN/WATER): 6-8

ODOR THRESHOLD: NOT AVAILABLE.

PERCENT VOLATILE: 0% AT 21 DEG. C

FREEZING POINT: DECOMPOSES.

BOILING POINT: NOT APPLICABLE.

SPECIFIC GRAVITY: 2.6 (WATER = 1)

VAPOR DENSITY: NOT AVAILABLE.

VAPOR PRESSURE: NOT AVAILABLE.

WATER/OIL DIST. COEFF.: NOT AVAILABLE.

EVAPORATION RATE: NOT APPLICABLE.

SOLUBILITY: 43% IN WATER.

SECTION IV. FIRE AND EXPLOSION DATA

FLASH POINT: NOT AVAILABLE.

FLAMMABLE LIMITS: NOT AVAILABLE.

AUTO-IGNITION TEMPERATURE: NOT AVAILABLE.

FIRE DEGRADATION PRODUCTS: OXIDES OF SULFUR, NITROGEN AND SODIUM. OXYGEN.

FIRE EXTINGUISHING PROCEDURES:
USE FLOODING QUANTITIES OF WATER. DO NOT USE CARBON DIOXIDE OR OTHER GAS-FILLED EXTINGUISHERS, THEY WILL HAVE NO EFFECT ON DECOMPOSING PERSULFATE. WEAR ADEQUATE PERSONAL PROTECTION TO PREVENT CONTACT WITH MATERIAL OR ITS COMBUSTION PRODUCTS. SELF CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

FIRE AND EXPLOSION HAZARDS:
POWERFUL OXIDIZING AGENT; MAY IGNITE OXIDIZABLE MATERIALS. DECOMPOSES WITH LIBERATION OF HEAT AND OXYGEN WHICH MAY INTENSIFY FIRE IN COMBUSTIBLE SURROUNDINGS. DECOMPOSITION IS ACCELERATED BY MOISTURE AND HIGHER TEMPERATURES. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE AND/OR EXPLOSION. CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS OR WHEN HEATED. EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION V. TOXICOLOGICAL PROPERTIES

ROUTES OF ENTRY: INHALATION AND INGESTION. SKIN CONTACT. EYE CONTACT.

EFFECTS OF ACUTE EXPOSURE:
HARMFUL BY INGESTION, INHALATION, OR SKIN ABSORPTION. IRRITANT. MAY BE SENSITIZER TO ALLERGIC PERSONS.

EYE: CAUSES SEVERE IRRITATION. MAY CAUSE BURNS.

SKIN:
CAUSES SKIN IRRITATION. CONTINUOUS CONTACT MAY PRODUCE SKIN DERMATITIS. MAY CAUSE SENSITIZATION BY SKIN CONTACT.

INHALATION:
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT. EXPOSURE CAN CAUSE COUGHING, CHEST PAINS, DIFFICULTY IN BREATHING. SENSITIVE INDIVIDUALS MAY DEVELOP ECZEMA AND/OR ASTHMA ON INHALATION OF THIS MATERIAL.

INGESTION:
CAUSES GASTROINTESTINAL IRRITATION. NAUSEA, VOMITING, ABDOMINAL PAIN, AND DIARRHEA. LARGE AMOUNTS MAY CAUSE INJURY OR DEATH.

EFFECTS OF CHRONIC OVEREXPOSURE:
ALLERGIC PERSONS MAY DEVELOP DERMATITIS AND ASTHMA. TO THE BEST OF OUR KNOWLEDGE THE CHRONIC TOXICITY OF THIS SUBSTANCE HAS NOT BEEN FULLY INVESTIGATED.

CARCINOGENIC EFFECTS: NOT AVAILABLE.

MUTAGENIC EFFECTS: NOT AVAILABLE.

TERATOGENIC EFFECTS: NOT AVAILABLE.

TOXICITY OF THE PRODUCT TO THE REPRODUCTIVE SYSTEM: NOT AVAILABLE.

MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED:
INDIVIDUALS WITH PREEXISTING DISEASES OF THE SKIN, EYE, OR RESPIRATORY SYSTEM MAY BE MORE SUSCEPTIBLE TO THE TOXICITY OF OVEREXPOSURE TO THIS PRODUCT.

SECTION VI. FIRST AID MEASURES

EYE CONTACT:
IMMEDIATELY FLUSH EYES WITH COPIOUS QUANTITIES OF WATER FOR AT LEAST 15 MINUTES HOLDING LIDS APART TO ENSURE FLUSHING OF THE ENTIRE SURFACE. CALL A PHYSICIAN.

SKIN CONTACT:
IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. IF IRRITATION OCCURS OR PERSISTS SEEK MEDICAL ATTENTION. WASH CONTAMINATED CLOTHING BEFORE REUSING.

INHALATION:
REMOVE PATIENT TO FRESH AIR. ADMINISTER APPROVED OXYGEN SUPPLY IF BREATHING IS DIFFICULT. ADMINISTER ARTIFICIAL RESPIRATION OR CPR IF BREATHING HAS CEASED. CALL A PHYSICIAN.

INGESTION:
IF CONSCIOUS, WASH OUT MOUTH WITH WATER. HAVE CONSCIOUS PERSON DRINK SEVERAL GLASSES OF WATER TO DILUTE. INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. SEEK IMMEDIATE MEDICAL ATTENTION. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON. SEE SECTION 10.

SECTION VII. REACTIVITY DATA

STABILITY: UNSTABLE. DECOMPOSES WITH EXOTHERMIC REACTION.

CONDITIONS TO AVOID:
HIGH TEMPERATURES, SPARKS, OPEN FLAMES AND ALL OTHER SOURCES OF IGNITION, CONTAMINATION.

HAZARDOUS DECOMP. PRODUCTS:
FUMES OF SULFURIC ACID MIST, OXYGEN WHICH SUPPORTS COMBUSTION AND OXIDES OF SULFUR.

INCOMPATIBILITY:
HEAT, MOISTURE, REDUCING AGENTS, HEAVY METALS, ACIDS, ALKALIES, HALIDES (FLUORIDES, CHLORIDES, BROMIDES, IODIDES), COMBUSTIBLE MATERIALS, OXIDIZABLE MATERIALS, ORGANIC MATERIALS, PERCHLORATES, POTASSIUM HYDROXIDE, SULFUR, ALCOHOLS, PHOSPHORUS, HYDRIDES, POWDERED METALS, HYDRAZINE, 2,2'-AZOBIS(2-AMIDINOPROPANE) HYDROCHLORIDE, OXIDIZING AGENTS. REACTS VIOLENTLY WITH MONOMERS (INITIATES POLYMERIZATION).

REACTION PRODUCTS:
REACTS WITH ACIDS, ALKALIS, HALIDES, COMBUSTIBLE AND HEAVY METALS TO RELEASE OXYGEN. METALS, EXCEPT STAINLESS STEEL, MAY CAUSE DECOMPOSITION. HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VIII. PREVENTIVE MEASURES

PROTECTIVE CLOTHING IN CASE OF SPILL AND LEAK:
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

SPILL AND LEAK:
EVACUATE. ELIMINATE ALL SOURCES OF IGNITION. MATERIAL SHOULD BE PUT INTO AN APPROVED DOT CONTAINER THEN DILUTED WITH LARGE QUANTITY OF WATER. AVOID RAISING DUST. USE CLEAN PLASTIC OR STAINLESS STEEL SCOOPS ONLY. VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICK UP IS COMPLETE. DO NOT EMPTY INTO DRAINS. DO NOT TOUCH SPILLED MATERIAL. AVOID CONTACT WITH A COMBUSTIBLE MATERIAL (WOOD, PAPER, OIL, CLOTHING...). USE NON-SPARKING TOOLS.

WASTE DISPOSAL:
ACCORDING TO ALL APPLICABLE REGULATIONS. HARMFUL TO AQUATIC LIFE AT LOW CONCENTRATIONS. CAN BE DANGEROUS IF ALLOWED TO ENTER DRINKING WATER INTAKES. DO NOT CONTAMINATE DOMESTIC OR IRRIGATION WATER SUPPLIES, LAKES, STREAMS, PONDS, OR RIVERS.

STORAGE AND HANDLING:
USE CLEAN PLASTIC OR STAINLESS STEEL SCOOPS ONLY. STORE IN A COOL PLACE AWAY FROM HEATED AREAS, SPARKS, AND FLAME. STORE IN A WELL VENTILATED AREA. STORE AWAY FROM INCOMPATIBLE MATERIALS. DO NOT ADD ANY OTHER MATERIAL TO THE CONTAINER. DO NOT WASH DOWN THE DRAIN. DO NOT BREATHE DUST. KEEP AWAY FROM DIRECT SUNLIGHT OR STRONG INCANDESCENT LIGHT. KEEP CONTAINER TIGHTLY CLOSED AND DRY. MANIPULATE UNDER AN ADEQUATE FUME HOOD. AVOID RAISING DUST. PROTECT FROM MOISTURE. MAY REACT IN PRESENCE OF MOISTURE. DO NOT USE PRESSURE TO DISPENSE. AVOID CONTACT WITH A COMBUSTIBLE MATERIAL (WOOD, PAPER, OIL, CLOTHING...). USE NON-SPARKING TOOLS. EMPTY CONTAINERS MAY CONTAIN A HAZARDOUS RESIDUE. HANDLE AND OPEN CONTAINER WITH CARE. MINIMIZE DUST GENERATION AND EXPOSURE - USE DUST MASK OR APPROPRIATE PROTECTION. TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING. THIS PRODUCT MUST BE MANIPULATED BY QUALIFIED PERSONNEL. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. WASH WELL AFTER USE. IN ACCORDANCE WITH GOOD STORAGE AND HANDLING PRACTICES. DO NOT ALLOW SMOKING AND FOOD CONSUMPTION WHILE HANDLING. DECOMPOSES IN STORAGE UNDER CONDITIONS OF EXCESSIVE HEAT AND/OR MOISTURE CAUSING RELEASE OF OXIDES OF SULFUR, DENSE MIST OF SULFURIC ACID, AND OXYGEN WHICH SUPPORTS COMBUSTION. CLEAN PLASTIC OR STAINLESS STEEL SCOOPS, SHOVELS, ETC., ARE SUITABLE FOR REMOVAL OF THE PRODUCT FROM THE SHIPPING CONTAINER. METALS OTHER THAN STAINLESS STEEL ARE APT TO CAUSE DECOMPOSITION OF PERSULFATE SOLUTIONS AND CARE SHOULD BE TAKEN SO THAT CONTAMINATES ARE NOT INTRODUCED.

SECTION IX. PROTECTIVE MEASURES

PROTECTIVE CLOTHING:
FACE SHIELD AND SPLASH GOGGLES. IMPERVIOUS NEOPRENE GLOVES, APRON, COVERALLS, AND/OR OTHER RESISTANT PROTECTIVE CLOTHING. SUFFICIENT TO PROTECT SKIN. A OSHA/MSHA JOINTLY APPROVED RESPIRATOR IS ADVISED IN THE ABSENCE OF PROPER ENVIRONMENTAL CONTROLS. IF MORE THAN TLV. DO NOT BREATHE VAPOR. WEAR SELF-CONTAINED BREATHING APPARATUS. DO NOT WEAR CONTACT LENSES. MAKE EYE BATH AND EMERGENCY SHOWER AVAILABLE. ENSURE THAT EYEWASH STATION AND SAFETY SHOWER IS PROXIMAL TO THE WORK-STATION LOCATION.

ENGINEERING CONTROLS:
USE ONLY IN A CHEMICAL FUME HOOD TO KEEP AIRBORNE LEVELS BELOW RECOMMENDED EXPOSURE LIMITS. DO NOT USE IN UNVENTILATED SPACES.

SECTION X. OTHER INFORMATION

SPECIAL PRECAUTIONS OR COMMENTS:

POWERFUL OXIDIZING AGENT; MAY IGNITE OXIDIZABLE MATERIALS.

SENSITIZER!

IRRITANT!

MAY CAUSE BURNS. DO NOT BREATHE DUST. AVOID ALL CONTACT WITH THE PRODUCT. AVOID PROLONGED OR REPEATED EXPOSURE. USE ONLY IN A CHEMICAL FUME HOOD. KEEP AWAY FROM HEAT, SPARKS AND FLAME. USE NON-SPARKING TOOLS. HEAT AND MOISTURE SENSITIVE. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE AND/OR EXPLOSION. HANDLE AND OPEN CONTAINER WITH CARE. CONTAINER SHOULD BE OPENED ONLY BY A TECHNICALLY QUALIFIED PERSON.

NOTES TO PHYSICIAN:
ASIDE FROM ALLERGIC REACTIONS SUCH AS DERMATITIS AND ASTHMA REPORTED IN ONE CASE ONLY, EXPOSURE PROBLEMS ARE RELATED TO THE OXIDIZING PROPERTIES AND RESEMBLE, AND ARE TREATED LIKE THOSE CAUSED BY STRONG ACIDS. HOWEVER, ATTEMPTS TO NEUTRALIZE WITH BASIC OR HALIDE-CONTAINING MATERIALS SHOULD BE AVOIDED BECAUSE OF POSSIBLE EXOTHERMIC REACTION.

FLOODING OF EXPOSURE AREAS WITH WATER IS SUGGESTED, BUT GASTRIC LAVAGE OR EMESIS INDUCTION FOR INGESTIONS MUST CONSIDER THE POSSIBLE AGGRAVATION OF ESOPHAGEAL INJURY AND THE EXPECTED ABSENCE OF SYSTEM EFFECTS. DEMULCENTS MAY BE HELPFUL. TREATMENT OTHERWISE IS SUPPORTIVE AND SYMPTOMATIC.

RTECS NO: SE0525000 (SODIUM PERSULFATE).

NFPA:

PREPARED BY: MSDS DEPARTMENT

VALIDATED: 23-MAY-2008

EMERGENCY NUMBERS:
(USA) CHEMTREC: 1 (800) 424-9300 (24 HRS)
(CAN) CANUTEC: 1 (613) 996-6666 (24 HRS)
(USA) ANACHEMIA: 1 (518) 297-4444
(CAN) ANACHEMIA: 1 (514) 489-5711

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A&K PETRO-CHEM CANADA
SULFURIC ACID Revised: 01/31/2005

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PREVENTATIVE MEASURES
TDG: SHIPPING INFORMATION

A & K PETROCHEM INDUSTRIES LTD.
316 EDGELEY BLVD.
CONCORD, ONTARIO, L4K 3Y3

TELEPHONE:
TORONTO: (416) 213-5611
CONCORD:

FAX: (905) 660-0773

EMERGENCY NUMBERS:
CANUTEC: (613) 996-6666
POISON CONTROL CENTRE: 598-5900

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

PRODUCT NAME: SULFURIC ACID

CHEMICAL NAME: SULFURIC ACID

SYNONYMS: OIL OF VITRIOL, HYDROGEN SULFATE, SULFURIC ACID

CHEMICAL FAMILY: INORGANIC ACID

MOLECULAR FORMULA: H2SO4

HAZARDOUS INGREDIENTS OF MATERIALS

NAME	%	LD50 (OR LC50)	TLV/TWA (MG/M3)	CAS NO.
SULFURIC ACID (H2SO4)	60-100	ORAL, RAT = 2140 MG/KG;	1.0	7664-93-9

PHYSICAL PROPERTIES

APPEARANCE AND ODOUR: CLEAR WATERLIKE WITH NO ODOUR

VAPOUR DENSITY: 3.4 (AIR=1)

BOILING POINT/RANGE: 327 DEG. C

EVAPORATION RATE: LESS THAN 1 (BUTYL ACETATE=1)

MELTING/FREEZING POINT: -2 DEG. C

VAPOUR PRESSURE: LESS THAN 0.3 (20 DEG. C)

SOLUBILITY: TOTALLY

SPECIFIC GRAVITY: 1.84 (H2O=1)

% VOLATILE BY VOLUME: NOT APPLICABLE

pH: 1.0 (0.05M SOLUTION)

FIRST AID PROCEDURES

INHALATION:
REMOVE TO FRESH AIR. IF NOT BREATHING, PER FORM ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION.

CONTACT WITH SKIN:
FLUSH IMMEDIATELY WITH WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING. GET IMMEDIATE MEDICAL ATTENTION. WASH CLOTHING BEFORE REUSE. DESTROY CONTAMINATED SHOES.

CONTACT WITH EYES:
FLUSH IMMEDIATELY WITH WATER FOR AT LEAST 15 MINUTES. FORCIBLY HOLD EYELIDS APART TO ENSURE COMPLETE IRRIGATION OF EYELID TISSUE. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION:
DRINK COPIOUS AMOUNTS OF WATER OR MILK. DO NOT INDUCE VOMITING. GET IMMEDIATE MEDICAL ATTENTION.

OTHER MEDICAL CARE:
NOTE TO PHYSICIAN: THE APPLICATION OF ICE TO SKIN BURNS WILL REDUCE SCARRING.

REACTIVITY DATA

STABILITY: STABLE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID:
CONCENTRATED ACID IS A STRONG OXIDIZING AGENT. MAY CAUSE IGNITION OF COMBUSTIBLE MATERIAL ON CONTACT WITH GENERATION SULPHUR DIOXIDE FUMES. AVOID OPEN FLAMES OR SPARKS.

MATERIALS TO AVOID:
MATERIAL IS STABLE WHEN PROPERLY HANDLED. HIGHLY REACTIVE WITH MATERIALS SUCH AS METALS, METAL OXIDES, HYDROXIDES, NITRATES, AMINES, CARBONATES AND OTHER ALKALINE MATERIALS. REACTIONS CAN GENERATE A GREAT DEAL OF HEAT AS DOES THE DILUTION OF ACID WITH WATER.

HAZARDOUS DECOMPOSITION OR COMBUSTION PRODUCTS:
EXPLOSIVE HYDROGEN GAS IS GENERATED BY THE ACTION OF ACID ON MOST METALS AND MAY ACCUMULATE IN METAL CONTAINERS.

FIRE AND EXPLOSION DATA

FLASH POINT (METHOD): NOT FLAMMABLE. MAY IGNITE COMBUSTIBLE MATERIALS.

AUTOIGNITION POINT: NOT APPLICABLE

FLAMMABILITY LIMITS IN AIR:
UEL (%): NOT APPLICABLE
LEL (%): NOT APPLICABLE

FIRE EXTINGUISHING MEDIA: DRY CHEMICAL, OR CO2 BASE FIRE EXTINGUISHERS

FIRE FIGHTING PROCEDURES:
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

OTHER FIRE OR EXPLOSION HAZARDS:
VIOLENT REACTION WITH WATER. EVOLUTION OF EXPLOSIVE HYDROGEN GAS ON CONTACT WITH MOST METALS.

TOXICOLOGICAL AND HEALTH DATA

RECOMMENDED EXPOSURE LIMIT (ACGIH TLV-TWA):
1.0 PPM OR 0.25 PPM EXPRESSED AS MIST OR SPRAY.

TOXICOLOGICAL DATA:
LD50 (ORAL, RAT) = 2140 MG/KG;
LD50 (DERMAL, RABBIT) = 3160 MG/KG;
LC50 (MICE) = 500 MG/KG (8 HRS)

CARCINOGENICITY DATA: NONE REPORTED NOR EXPECTED

REPRODUCTIVE EFFECTS: NONE REPORTED NOR EXPECTED

MUTAGENICITY DATA: NONE REPORTED NOR EXPECTED

TERATOGENICITY DATA: NONE REPORTED NOR EXPECTED

SYNERGISTIC MATERIALS: NONE REPORTED NOR EXPECTED

EFFECTS OF EXPOSURE FROM:

INHALATION:
INHALATION OF CONCENTRATED VAPOUR OR MIST WILL DAMAGE UPPER RESPIRATORY TRACT AND LUNG TISSUES. REPEATED EXPOSURE MAY CAUSE CHRONIC BRONCHITIS OR INFLAMMATION.

SKIN CONTACT:
CONTACT WITH LIQUID, MIST OR VAPOUR CAN CAUSE IMMEDIATE IRRITATION OR CORROSIVE BURNS TO ALL HUMAN TISSUE. SEVERITY OF THE BURN IS GENERALLY DETERMINED BY THE CONCENTRATION OF THE SOLUTION AND DURATION OF EXPOSURE. REPEATED SKIN CONTACT WITH DILUTE SOLUTIONS MAY CAUSE DERMATITIS.

EYE CONTACT:
CONTACT WITH EYES MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED QUICKLY BY THOROUGH IRRIGATION WITH WATER.

INGESTION:
NAUSEA, VOMITING, SEVERE BURNS TO MOUTH, THROAT AND STOMACH, KIDNEY DYSFUNCTION, LUNG DAMAGE.

OTHER HEALTH EFFECTS: NOT AVAILABLE/REPORTED

PREVENTATIVE MEASURES

ENGINEERING CONTROLS:
LOCAL EXHAUST: REQUIRED
MECHANICAL (GENERAL): NOT COMPULSORY

RESPIRATORY PROTECTION:
NONE, WHERE ADEQUATE VENTILATION EXISTS, IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF CONTAINED BREATHING APPARATUS IS ADVISED

SKIN PROTECTION: PVC OR NEOPRENE

EYE PROTECTION: GOGGLES AND FACE SHIELD

OTHER PERSONAL PROTECTIVE EQUIPMENT:
SAFETY SHOWERS AND EYE WASH FOUNTAINS SHOULD BE INSTALLED IN STORAGE AND HANDLING AREAS.

HANDLING PROCEDURES AND EQUIPMENT:
WHEN DILUTING, SLOWLY ADD ACID TO WATER WHILE STIRRING TO AVOID SPLATTERING OR BOILING. WATER CANNOT BE ADDED SAFELY TO CONCENTRATED ACID. DO NOT STRIKE CONTAINERS AT FITTINGS WITH TOOLS OR HARD OBJECTS. WASH THOROUGHLY AFTER HANDLING. EMPTIED CONTAINER RETAINS VAPOUR AND PRODUCT RESIDUE.

STORAGE REQUIREMENTS:
PROTECT CONTAINER FROM PHYSICAL DAMAGE. KEEP CONTAINER CLOSED AND PROTECT FROM CONTACT WITH WATER TO AVOID POSSIBLE VIOLENT REACTION. STORE AWAY FROM SOURCES OF IGNITION.

OTHER PRECAUTIONS: NOT APPLICABLE

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR LEAK:
UTILIZE FULL PROTECTIVE CLOTHING, INCLUDING BOOTS AND PROTECTIVE EQUIPMENT. CONTAIN SPILL IN ORDER TO PREVENT CONTAMINATION OF SEWAGE SYSTEM OR WATERWAY.

PUMP INTO MARKED CONTAINERS FOR RECLAMATION OR DISPOSAL. IF POSSIBLE, NEUTRALIZE ON A DRY BASIS WITH SUITABLE ALKALI SUCH AS LIME, SODA ASH OR SODIUM BICARBONATE; THEN FLUSH WITH WATER IN ACCORDANCE WITH APPLICABLE REGULATIONS.

ENVIRONMENTAL EFFECTS: NOT AVAILABLE/REPORTED

DEACTIVATING CHEMICALS: NOT APPLICABLE

WASTE DISPOSAL METHODS:
DISPOSE OF SPILLED, NEUTRALIZED, OR WASTE PRODUCT, CONTAMINATED SOIL AND OTHER CONTAMINATED MATERIALS IN LICENSED LANDFILL OR TREATMENT FACILITY IN ACCORDANCE WITH FEDERAL, PROVINCIAL, STATE, AND LOCAL REGULATIONS ON CHEMICAL WASTE DISPOSAL.

TDG: SHIPPING INFORMATION

SHIPPING NAME: SULFURIC ACID, MORE THAN 51 PERCENT ACID

SHIPPING CLASS: 8 (9.2)

UN: 1830

PACKING GROUP: II

WHMIS CLASS: E, D1

DATE ISSUED: OCTOBER 31, 1988

DATE REVISED: JANUARY 31, 2005

PREPARED BY: THOMAS KYRON

MSDS INDEX NO.:

THE INFORMATION SET FORTH HEREIN HAS BEEN GATHERED FROM STANDARD REFERENCE MATERIALS AND/OR A & K PETROCHEM INDUSTRIES LTD TEST DATA AND IS TO THE BEST KNOWLEDGE AND BELIEF OF A & K PETROCHEM INDUSTRIES LTD ACCURATE AND RELIABLE. SUCH INFORMATION IS OFFERED SOLELY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION, AND IT IS NOT SUGGESTED OR GUARANTEED THAT THE HAZARD PRECAUTIONS OR PROCEDURES MENTIONED ARE THE ONLY ONES WHICH EXIST. A & K PETROCHEM INDUSTRIES LTD MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE USE OF SUCH INFORMATION OR THE USE OF THE SPECIFIC MATERIAL IDENTIFIED HEREIN IN COMBINATION WITH ANY OTHER MATERIAL OR PROCESS, AND ASSUMES NO RESPONSIBILITY THEREFORE.

ALFA AESAR
TRICHLOROETHYLENE, 43487 Revised: 09/26/2003

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ALFA AESAR(R*)
A JOHNSON MATTHEY COMPANY

MATERIAL SAFETY DATA SHEET

ACC. TO OSHA AND ANSI

PRINTING DATE: 09/29/2003

REVIEWED ON: 09/26/2003

1 IDENTIFICATION OF SUBSTANCE

PRODUCT DETAILS:

PRODUCT NAME: TRICHLOROETHYLENE

STOCK NUMBER: 43487

MANUFACTURER/SUPPLIER:
ALFA AESAR, A JOHNSON MATTHEY COMPANY
JOHNSON MATTHEY CATALOG COMPANY, INC.
30 BOND STREET
WARD HILL, MA 01835-8099

EMERGENCY PHONE: (978) 521-6300

CHEMTREC: (800) 424-9300

WEB SITE: WWW.ALFA.COM

INFORMATION DEPARTMENT: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT

EMERGENCY INFORMATION:
DURING NORMAL HOURS THE HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.
AFTER NORMAL HOURS CALL CHEMTREC AT (800) 424-9300.

2 COMPOSITION/DATA ON COMPONENTS

CHEMICAL CHARACTERIZATION:

DESCRIPTION	(CAS#)	
TRICHLOROETHYLENE	(CAS# 79-01-6)	100%

IDENTIFICATION NUMBER(S):

EINECS NUMBER: 201-167-4

EU NUMBER: 602-027-00-9

3 HAZARDS IDENTIFICATION

HAZARD DESCRIPTION:
T: TOXIC

INFORMATION PERTAINING TO PARTICULAR DANGERS FOR MAN AND ENVIRONMENT:
CAUSES A NARCOTIC EFFECT.

R 45: MAY CAUSE CANCER.

R 36/38: IRRITATING TO EYES AND SKIN.

R 52/53:
HARMFUL TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

R 67: VAPORS MAY CAUSE DROWSINESS AND DIZZINESS

CLASSIFICATION SYSTEM:

HMIS RATINGS (SCALE 0-4):
(HAZARDOUS MATERIALS IDENTIFICATION SYSTEM):
HEALTH (ACUTE EFFECTS) 2
FLAMMABILITY 0
REACTIVITY 0

4 FIRST AID MEASURES

AFTER INHALATION:
SUPPLY FRESH AIR. IF REQUIRED, PROVIDE ARTIFICIAL RESPIRATION. KEEP PATIENT WARM. SEEK IMMEDIATE MEDICAL ADVICE.

AFTER SKIN CONTACT:
IMMEDIATELY WASH WITH WATER AND SOAP AND RINSE THOROUGHLY.
SEEK IMMEDIATE MEDICAL ADVICE.

AFTER EYE CONTACT:
RINSE OPENED EYE FOR SEVERAL MINUTES UNDER RUNNING WATER. THEN CONSULT A DOCTOR.

AFTER SWALLOWING: SEEK IMMEDIATE MEDICAL ADVICE.

5 FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING AGENTS:
PRODUCT IS NOT FLAMMABLE. USE FIRE FIGHTING MEASURES THAT SUIT THE SURROUNDING FIRE.

SPECIAL HAZARDS CAUSED BY THE MATERIAL, ITS PRODUCTS OF COMBUSTION OR RESULTING GASES:
IN CASE OF FIRE, THE FOLLOWING CAN BE RELEASED:
CARBON MONOXIDE AND CARBON DIOXIDE
HYDROGEN CHLORIDE (HCl)

PROTECTIVE EQUIPMENT:
WEAR SELF-CONTAINED RESPIRATOR.
WEAR FULLY PROTECTIVE IMPERVIOUS SUIT.

6 ACCIDENTAL RELEASE MEASURES

PERSON-RELATED SAFETY PRECAUTIONS:
WEAR PROTECTIVE EQUIPMENT. KEEP UNPROTECTED PERSONS AWAY.
ENSURE ADEQUATE VENTILATION

MEASURES FOR ENVIRONMENTAL PROTECTION:
DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER

GOVERNMENTAL PERMITS.

MEASURES FOR CLEANING/COLLECTING:
ABSORB WITH LIQUID-BINDING MATERIAL (SAND, DIATOMITE, ACID BINDERS, UNIVERSAL BINDERS, SAWDUST).
DISPOSE CONTAMINATED MATERIAL AS WASTE ACCORDING TO ITEM 13.

ADDITIONAL INFORMATION:
SEE SECTION 7 FOR INFORMATION ON SAFE HANDLING
SEE SECTION 8 FOR INFORMATION ON PERSONAL PROTECTION EQUIPMENT.
SEE SECTION 13 FOR DISPOSAL INFORMATION.

7 HANDLING AND STORAGE

HANDLING:

INFORMATION FOR SAFE HANDLING:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY PLACE IN TIGHTLY CLOSED CONTAINERS.
ENSURE GOOD VENTILATION AT THE WORKPLACE.
OPEN AND HANDLE CONTAINER WITH CARE.

INFORMATION ABOUT PROTECTION AGAINST EXPLOSIONS AND FIRES:
THE PRODUCT IS NOT FLAMMABLE

STORAGE:

REQUIREMENTS TO BE MET BY STOREROOMS AND RECEPTACLES:
NO SPECIAL REQUIREMENTS.

INFORMATION ABOUT STORAGE IN ONE COMMON STORAGE FACILITY:
STORE IN THE DARK.
STORE AWAY FROM OXIDIZING AGENTS.

FURTHER INFORMATION ABOUT STORAGE CONDITIONS:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY CONDITIONS IN WELL SEALED CONTAINERS.
PROTECT FROM EXPOSURE TO LIGHT.
STORE UNDER LOCK AND KEY AND WITH ACCESS RESTRICTED TO TECHNICAL EXPERTS OR THEIR ASSISTANTS ONLY.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

ADDITIONAL INFORMATION ABOUT DESIGN OF TECHNICAL SYSTEMS:
PROPERLY OPERATING CHEMICAL FUME HOOD DESIGNED FOR HAZARDOUS CHEMICALS AND HAVING AN AVERAGE FACE VELOCITY OF AT LEAST 100 FEET PER MINUTE.

COMPONENTS WITH LIMIT VALUES THAT REQUIRE MONITORING AT THE WORKPLACE:

TRICHLOROETHYLENE:

	PPM
ACGIH TLV	50; 100-STEL NOT CLASSIFIED AS A HUMAN CARCINOGEN
AUSTRIA MAK	50; SUSPECTED CARCINOGEN
BELGIUM TWA	50; 200-STEL
DENMARK TWA	10
FINLAND TWA	30; 45-STEL (SKIN)
FRANCE VME	75; 200-VLE; C3 CARCINOGEN
GERMANY MAK	50; CARCINOGEN
HUNGARY TWA	10 MG/M3; 40 MG/M3-STEL
JAPAN OEL	50; 2B CARCINOGEN
KOREA TLV	50; 100-STEL

NETHERLANDS MAC-TGG	35; 100-MAC-K
POLAND TWA	50 MG/M3; 400 MG/M3-STEL
RUSSIA TWA	50; 10 MG/M3-STEL
SWEDEN NGV	10; 25-KTV; CARCINOGEN
SWITZERLAND MAK-W	50; 250-KZG-W
UNITED KINGDOM TWA	100; 150-STEL (SKIN)
USA PEL	100; 200-CEILING; 300 (5 MINUTE PEAK/2 HOURS)

ADDITIONAL INFORMATION: NO DATA

PERSONAL PROTECTIVE EQUIPMENT:

GENERAL PROTECTIVE AND HYGIENIC MEASURES:
THE USUAL PRECAUTIONARY MEASURES FOR HANDLING CHEMICALS SHOULD BE FOLLOWED.
KEEP AWAY FROM FOODSTUFFS, BEVERAGES AND FEED.
REMOVE ALL SOILED AND CONTAMINATED CLOTHING IMMEDIATELY.
WASH HANDS BEFORE BREAKS AND AT THE END OF WORK.
STORE PROTECTIVE CLOTHING SEPARATELY.
AVOID CONTACT WITH THE EYES AND SKIN.

BREATHING EQUIPMENT:
USE SUITABLE RESPIRATOR WHEN HIGH CONCENTRATIONS ARE PRESENT.

PROTECTION OF HANDS:
IMPERVIOUS GLOVES
CHECK PROTECTIVE GLOVES PRIOR TO EACH USE FOR THEIR PROPER CONDITION.

MATERIAL OF GLOVES:
THE SELECTION OF SUITABLE GLOVES NOT ONLY DEPENDS ON THE MATERIAL, BUT ALSO ON QUALITY. QUALITY WILL VERY FROM MANUFACTURER TO MANUFACTURER.

EYE PROTECTION: SAFETY GLASSES

BODY PROTECTION: PROTECTIVE WORK CLOTHING.

9 PHYSICAL AND CHEMICAL PROPERTIES

GENERAL INFORMATION:

FORM: LIQUID

COLOR: COLORLESS

ODOR: CHARACTERISTIC

	VALUE/RANGE	UNIT	METHOD
CHANGE IN CONDITION:			
MELTING POINT/MELTING RANGE	-85	DEG. C	
BOILING POINT/BOILING RANGE	87	DEG. C	
SUBLIMATION TEMPERATURE / START	NOT DETERMINED		
FLASH POINT	NOT DETERMINED		
IGNITION TEMPERATURE	NOT DETERMINED		
DECOMPOSITION TEMPERATURE	NOT DETERMINED		
DANGER OF EXPLOSION	PRODUCT DOES NOT PRESENT AN EXPLOSION HAZARD.		
EXPLOSION LIMITS:			
LOWER	NOT DETERMINED		
UPPER	NOT DETERMINED		
VAPOR PRESSURE	NOT DETERMINED		

DENSITY AT 20 DEG. C	1.46	G/CM3
SOLUBILITY IN / MISCIBILITY WITH WATER	NOT MISCIBLE OR DIFFICULT TO MIX	

10 STABILITY AND REACTIVITY

THERMAL DECOMPOSITION / CONDITIONS TO BE AVOIDED:
DECOMPOSITION WILL NOT OCCUR IF USED AND STORED ACCORDING TO SPECIFICATIONS.

MATERIALS TO BE AVOIDED:
LIGHT
OXIDIZING AGENTS

DANGEROUS REACTIONS: NO DANGEROUS REACTIONS KNOWN

DANGEROUS PRODUCTS OF DECOMPOSITION:
CARBON MONOXIDE AND CARBON DIOXIDE
HYDROGEN CHLORIDE (HCl)

11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

LD/LC50 VALUES THAT ARE RELEVANT FOR CLASSIFICATION:

ORAL:
LD50: 2402 MG/KG (MUS)
LD50: 4920 MG/KG (RAT)
LDLO: 5864 MG/KG (CAT)
LDLO: 7 GM/KG (HMN)
LDLO: 7330 MG/KG (RBT)

DERMAL:
LD50: >20 GM/KG (RBT)

INHALATIVE:
LC50/4H: 8450 PPM/4H (MUS)
LCLO: 2900 PPM (MAN)
LCLO: 11000 PPM (RBT)
LCLO/2H: 32500 MG/M3/2H (CAT)
LCLO/4H: 4800 PPM/4H (RAT)

IRRITATION OF SKIN:
SEVERE: 2 MG/24H (RBT)

IRRITATION OF EYES:
MILD: 20 MG/24H (RBT)

PRIMARY IRRITANT EFFECT:
ON THE SKIN: IRRITANT TO SKIN AND MUCOUS MEMBRANES.
ON THE EYE: IRRITATING EFFECT.

SENSITIZATION: NO SENSITIZING EFFECTS KNOWN.

OTHER INFORMATION (ABOUT EXPERIMENTAL TOXICOLOGY):
TUMORIGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
REPRODUCTIVE EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH BACTERIA.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED WITH HUMANS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH HUMAN LYMPHOCYTES.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH MAMMALS.

SUBACUTE TO CHRONIC TOXICITY:

SUBACUTE TO CHRONIC TOXICITY:
THE REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) REPORTS THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:
BEHAVIORAL - SOMNOLENCE (GENERAL DEPRESSED ACTIVITY).
BEHAVIORAL - TREMOR.
BEHAVIORAL - COMA.
BEHAVIORAL - HALLUCINATIONS, DISTORTED PERCEPTIONS.
BEHAVIORAL - ALTERED SLEEP TIME (INCLUDING CHANGE IN RIGHTING REFLEX).

BEHAVIORAL - ATAXIA.
BEHAVIORAL - SLEEP.
BEHAVIORAL - GENERAL ANESTHETIC.
BEHAVIORAL - CHANGES IN MOTOR ACTIVITY (SPECIFIC ASSAY).
BEHAVIORAL - ALTERATION OF OPERANT CONDITIONING.
BEHAVIORAL - CHANGES IN PSYCHOPHYSIOLOGICAL TESTS.
BEHAVIORAL - TOLERANCE.

LUNGS, THORAX, OR RESPIRATION - RESPIRATORY DEPRESSION.
LUNGS, THORAX, OR RESPIRATION - TUMORS.

SKIN AND APPENDAGES - HAIR.
SKIN AND APPENDAGES - TUMORS.

LIVER - JAUNDICE, OTHER OR UNCLASSIFIED.
LIVER - LIVER FUNCTION TESTS IMPAIRED.
LIVER - CHANGES IN LIVER WEIGHT.
LIVER - OTHER CHANGES.
LIVER - HEPATITIS (HEPATOCELLULAR NECROSIS), ZONAL
LIVER - TUMORS.

VASCULAR - TUMORS.

SENSE ORGANS AND SPECIAL SENSES (EYE) - EFFECT, NOT OTHERWISE SPECIFIED.
SENSE ORGANS AND SPECIAL SENSES (EAR) - CHANGE IN ACUITY.

GASTROINTESTINAL - OTHER CHANGES.

KIDNEY, URETER, BLADDER - CHANGES IN BOTH TUBULES AND GLOMERULI.
KIDNEY, URETER, BLADDER - PROTEINURIA.
KIDNEY, URETER, BLADDER - CHANGES IN BLADDER WEIGHT.
KIDNEY, URETER, BLADDER - OTHER CHANGES IN URINE COMPOSITION.

NUTRITIONAL AND GROSS METABOLIC - WEIGHT LOSS OR DECREASED WEIGHT GAIN.
RELATED TO CHRONIC DATA - DEATH.

PERIPHERAL NERVE AND SENSATION - SPASTIC PARALYSIS WITH OR WITHOUT SENSORY CHANGE.

BLOOD - CHANGES IN SERUM COMPOSITION (E.G. TP, BILIRUBIN, CHOLESTEROL).
BLOOD - PIGMENTED OR NUCLEATED RED BLOOD CELLS.
BLOOD - CHANGES IN LEUKOCYTE (WBC) COUNT.
BLOOD - CHANGES IN BONE MARROW (NOT OTHERWISE SPECIFIED).
BLOOD - LYMPHOMA, INCLUDING HODGKIN'S DISEASE.
BLOOD - TUMORS.

IMMUNOLOGICAL INCLUDING ALLERGIC - DECREASED IMMUNE RESPONSE.
IMMUNOLOGICAL INCLUDING ALLERGIC - DECREASE IN HUMORAL IMMUNE RESPONSE.

BRAIN AND COVERINGS - RECORDINGS FROM SPECIFIC AREAS OF CNS.
BRAIN AND COVERINGS - DEMEYLINATION.
BRAIN AND COVERINGS - OTHER DEGENERATIVE CHANGES.

ENDOCRINE - CHANGES IN SPLEEN WEIGHT.
ENDOCRINE - OTHER CHANGES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - OTHER TRANSFERASES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - DEHYDROGENASES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - TRANSAMINASES.

BIOCHEMICAL - METABOLISM (INTERMEDIARY) - OTHER PROTEINS.
BIOCHEMICAL - METABOLISM (INTERMEDIARY) - LIPIDS INCLUDING TRANSPORT.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - HEPATIC MICROSOMAL MIXED OXIDASE.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - OTHER ESTERASES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - PHOSPHATASES.

REPRODUCTIVE - EFFECTS ON NEWBORN - BEHAVIORAL.
REPRODUCTIVE - EFFECTS ON NEWBORN - WEANING OR LACTATION INDEX (E.G., # ALIVE AT WEANING PER # ALIVE AT DAY 4).

REPRODUCTIVE - SPECIFIC DEVELOPMENTAL ABNORMALITIES - CENTRAL NERVOUS SYSTEM.
REPRODUCTIVE - SPECIFIC DEVELOPMENTAL ABNORMALITIES - MUSCULOSKELETAL SYSTEM.

REPRODUCTIVE - SPECIFIC DEVELOPMENTAL ABNORMALITIES - OTHER DEVELOPMENTAL ABNORMALITIES.

REPRODUCTIVE - PATERNAL EFFECTS - SPERMATOGENESIS (INCLUDING GENETIC MATERIAL, SPERM MORPHOLOGY, MOTILITY, AND COUNT).

TUMORIGENIC - CARCINOGENIC BY RTECS CRITERIA.
TUMORIGENIC - EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA.

SUBACUTE TO CHRONIC TOXICITY:
TRICHLOROETHYLENE CAUSES DEPRESSION OF THE CENTRAL NERVOUS SYSTEM, DERMATITIS, AND DAMAGE TO THE LIVER, KIDNEYS, CENTRAL NERVOUS SYSTEM AND POSSIBLY OTHER ORGANS.
MAY CROSS THE PLACENTAL BARRIER IN HUMANS.

ADDITIONAL TOXICOLOGICAL INFORMATION:
TO THE BEST OF OUR KNOWLEDGE THE ACUTE AND CHRONIC TOXICITY OF THIS SUBSTANCE IS NOT FULLY KNOWN.

IARC-2A:
PROBABLY CARCINOGENIC TO HUMANS:
LIMITED HUMAN EVIDENCE; SUFFICIENT EVIDENCE IN EXPERIMENTAL ANIMALS

NTP-2:
REASONABLY ANTICIPATED TO BE A CARCINOGEN:
LIMITED EVIDENCE FROM STUDIES IN HUMANS OR SUFFICIENT EVIDENCE FROM STUDIES IN EXPERIMENTAL ANIMALS.

ACGIH A5:
NOT SUSPECTED AS A HUMAN CARCINOGEN:
NOT SUSPECTED AS A HUMAN CARCINOGEN ON THE BASIS OF PROPERLY CONDUCTED EPIDEMIOLOGIC STUDIES IN HUMANS. STUDIES HAVE SUFFICIENTLY LONG FOLLOW-UP, RELIABLE EXPOSURE HISTORIES, SUFFICIENTLY HIGH DOSE, AND ADEQUATE STATISTICAL POWER TO CONCLUDE THAT EXPOSURE TO THE AGENT DOES NOT CONVEY A SIGNIFICANT RISK OF CANCER TO HUMANS. EVIDENCE SUGGESTING A LACK OF CARCINOGENICITY IN EXPERIMENTAL ANIMALS WILL BE CONSIDERED IF IT IS SUPPORTED BY OTHER RELEVANT DATA.

12 ECOLOGICAL INFORMATION

ECOTOXICAL EFFECTS:

REMARK: HARMFUL TO FISH

GENERAL NOTES:
DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER GOVERNMENTAL PERMITS.
HARMFUL TO AQUATIC ORGANISMS

13 DISPOSAL CONSIDERATIONS

PRODUCT:

RECOMMENDATION:
CONSULT STATE, LOCAL OR NATIONAL REGULATIONS TO ENSURE PROPER DISPOSAL.

UNCLEANED PACKAGINGS:
RECOMMENDATION: DISPOSAL MUST BE MADE ACCORDING TO OFFICIAL REGULATIONS.

14 TRANSPORT INFORMATION

DOT REGULATIONS:
HAZARD CLASS: 6.1
IDENTIFICATION NUMBER: UN1710
PACKING GROUP: III
HAZARDOUS SUBSTANCE: 100 LBS, 45.4 KG
PROPER SHIPPING NAME (TECHNICAL NAME): TRICHLOROETHYLENE

LAND TRANSPORT ADR/RID (CROSS-BORDER):
ADR/RID CLASS: 6.1 TOXIC SUBSTANCES
ITEM: 15C
DANGER CODE (KEMLER): 60
UN-NUMBER: 1710
DESCRIPTION OF GOODS: TRICHLOROETHYLENE

MARITIME TRANSPORT IMDG:
IMDG CLASS: 6.1
UN NUMBER: 1710
PACKAGING GROUP: III
PROPER SHIPPING NAME: TRICHLOROETHYLENE

AIR TRANSPORT ICAO-TI AND IATA-DGR:
ICAO/IATA CLASS: 6.1
UN/ID NUMBER: 1710
PACKAGING GROUP: III
PROPER SHIPPING NAME: TRICHLOROETHYLENE

15 REGULATIONS

PRODUCT RELATED HAZARD INFORMATION:

HAZARD SYMBOLS:
T: TOXIC

RISK PHRASES:

45: MAY CAUSE CANCER.

36/38: IRRITATING TO EYES AND SKIN.

52/53:
HARMFUL TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

67: VAPORS MAY CAUSE DROWSINESS AND DIZZINESS

SAFETY PHRASES:

53: AVOID EXPOSURE - OBTAIN SPECIAL INSTRUCTIONS BEFORE USE.

45:
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY.

61:
AVOID RELEASE TO THE ENVIRONMENT. REFER TO SPECIAL INSTRUCTIONS/SAFETY DATA SHEETS

NATIONAL REGULATIONS:
ALL COMPONENTS OF THIS PRODUCT ARE LISTED IN THE U.S. ENVIRONMENTAL PROTECTION AGENCY TOXIC SUBSTANCES CONTROL ACT CHEMICAL SUBSTANCE INVENTORY.
THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER OR REPRODUCTIVE TOXICITY.

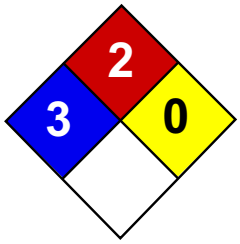
INFORMATION ABOUT LIMITATION OF USE:
FOR USE ONLY BY TECHNICALLY QUALIFIED INDIVIDUALS.
THIS PRODUCT IS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372.

16 OTHER INFORMATION

EMPLOYERS SHOULD USE THIS INFORMATION ONLY AS A SUPPLEMENT TO OTHER INFORMATION GATHERED BY THEM, AND SHOULD MAKE INDEPENDENT JUDGMENT OF SUITABILITY OF THIS INFORMATION TO ENSURE PROPER USE AND PROTECT THE HEALTH AND SAFETY OF EMPLOYEES.
THIS INFORMATION IS FURNISHED WITHOUT WARRANTY, AND ANY USE OF THE PRODUCT NOT IN CONFORMANCE WITH THIS MATERIAL SAFETY DATA SHEET, OR IN COMBINATION WITH ANY OTHER PRODUCT OR PROCESS, IS THE RESPONSIBILITY OF THE USER.

DEPARTMENT ISSUING MSDS: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.

CONTACT: DARRELL R. SANDERS



Material Safety Data Sheet
Acetic acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetic acid

Catalog Codes: SLA3784, SLA1438, SLA2101, SLA3604, SLA1258

CAS#: 64-19-7

RTECS: AF1225000

TSCA: TSCA 8(b) inventory: Acetic acid

CI#: Not applicable.

Synonym: Acetic acid; glacial acetic acid

Chemical Name: Acetic Acid, Glacial

Chemical Formula: C2-H4-O2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetic acid	64-19-7	100

Toxicological Data on Ingredients: Acetic acid: ORAL (LD50): Acute: 3310 mg/kg [Rat]. 4960 mg/kg [Mouse]. 3530 mg/kg [Rat]. DERMAL (LD50): Acute: 1060 mg/kg [Rabbit]. VAPOR (LC50): Acute: 5620 ppm 1 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, mucous membranes, skin, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated

or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 463°C (865.4°F)

Flash Points: CLOSED CUP: 39°C (102.2°F). OPEN CUP: 43°C (109.4°F).

Flammable Limits: LOWER: 4% UPPER: 19.9%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials, of metals.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Reacts with metals to produces flammable hydrogen gas. It will ignite on contact with potassium-tert-butoxide. A mixture of ammonium nitrate and acetic acid ignites when warmed, especially if warmed.

Special Remarks on Explosion Hazards:

Acetic acid vapors may form explosive mixtures with air. Reactions between acetic acid and the following materials are potentially explosive: 5-azidotetrazole, bromine pentafluoride, chromium trioxide, hydrogen peroxide, potassium permanganate, sodium peroxide, and phorphorus trichloride. Dilute acetic acid and dilute hydrogen can undergo an exothermic reaction if heated, forming peracetic acid which is explosive at 110 degrees C. Reaction between chlorine trifluoride and acetic acid is very violent, sometimes explosive.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Flammable liquid. Corrosive liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form: Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Absorb with an inert material and put the spilled material in an appropriate waste disposal. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
\Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Synthetic apron. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 STEL: 15 (ppm) [Australia] TWA: 25 STEL: 27 (mg/m3) [Australia] TWA: 10 STEL: 15 (ppm) from NIOSH TWA: 25 STEL: 37 (mg/m3) from NIOSH TWA: 10 STEL: 15 (ppm) [Canada] TWA: 26 STEL: 39 (mg/m3) [Canada] TWA: 25 STEL: 37 (mg/m3) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 25 (mg/m3) from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent, vinegar-like, sour (Strong.)

Taste: Vinegar, sour (Strong.)

Molecular Weight: 60.05 g/mole

Color: Colorless. Clear (Light.)

pH (1% soln/water): 2 [Acidic.]

Boiling Point: 118.1°C (244.6°F)

Melting Point: 16.6°C (61.9°F)

Critical Temperature: 321.67°C (611°F)

Specific Gravity: 1.049 (Water = 1)

Vapor Pressure: 1.5 kPa (@ 20°C)

Vapor Density: 2.07 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.48 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Easily soluble in cold water, hot water. Soluble in diethyl ether, acetone. Miscible with Glycerol, alcohol, Benzene, Carbon Tetrachloride. Practically insoluble in Carbon Disulfide.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, metals, acids, alkalis.

Corrosivity:
Highly corrosive in presence of stainless steel(304). Slightly corrosive in presence of aluminum, of copper. Non-corrosive in presence of stainless steel(316).

Special Remarks on Reactivity:
Reacts violently with strong oxidizing agents, acetaldehyde, and acetic anhydride. Material can react with metals, strong bases, amines, carbonates, hydroxides, phosphates, many oxides,cyanides, sulfides, chromic acid, nitric acid, hydrogen peroxide, carbonates. ammonium nitrate, ammonium thiosulfate, chlorine trifluoride, chlorosulfonic acid, perchloric acid, permanganates, xylene, oleum, potassium hydroxide, sodium hydroxide, phosphorus isocyanate, ethylenediamine, ethylene imine.

Special Remarks on Corrosivity: Moderate corrosive effect on bronze. No corrosion data on brass

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3310 mg/kg [Rat]. Acute dermal toxicity (LD50): 1060 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5620 1 hours [Mouse].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, mucous membranes, skin, teeth.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material and may cause reproductive effects based on animal data. No human data found.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Extremely irritating and corrosive. Causes skin irritation (reddening and itching, inflammation). May cause blistering , tissue damage and burns. Eyes: Extremely irritating and corrosive. Causes eye irritation, lacrimation, redness, and pain. May cause burns, blurred vision, conjunctivitis, conjunctival and corneal destruction and permanent injury. Inhalation: Causes severe respiratory tract irritation. Affects the sense organs (nose, ear, eye, taste), and blood. May cause chemical pneumonitis, bronchitis, and pulmonary edema. Severe exposure may result in lung tissue damage and corrosion (ulceration) of the mucous membranes. Inhalation may also cause rhinitis, sneezing, coughing, oppressive feeling in the chest or chest pain, dyspnea, wheezing, tachypnea, cyanosis, salivation, nausea, giddiness, muscular weakness. Ingestion: Moderately toxic. Corrosive. Causes gastrointestinal tract irritation (burning and pain of the mouth, throat, and abdomen, coughing, ulceration, bleeding, nausea, abdomial spasms, vomiting, hematemesis, diarrhea. May Also affect the liver (impaired liver function), behavior (convulsions, giddines, muscular weakness), and the urinary system - kidneys (Hematuria, Albuminuria, Nephrosis, acute renal failure, acute tubular necrosis). May also cause dyspnea or asphyxia. May also lead to shock, coma and death. Chronic Potential Health Effects: Chronic exposure via ingestion may cause blackening or erosion of the teeth and jaw necrosis, pharyngitis, and gastritis. It may also behavior (similar to acute ingestion), and metabolism (weight loss). Chronic exposure via inhalation may cause asthma and/or bronchitis with cough, phlegm, and/or shortness of breath . It may also affect the blood (decreased leukocyte count), and urinary system (kidneys). Repeated or prolonged skin contact may cause thickening, blackening, and cracking of the skin.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 423 mg/l 24 hours [Fish (Goldfish)]. 88 ppm 96 hours [Fish (fathead minnow)]. 75 ppm 96 hours [Fish (bluegill sunfish)]. >100 ppm 96 hours [Daphnia].

BOD5 and COD: BOD-5: 0.34-0.88 g oxygen/g

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification:

CLASS 3: Flammable liquid. Class 8: Corrosive material

Identification: : Acetic Acid, Glacial UNNA: 2789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
New York release reporting list: Acetic acid Rhode Island RTK hazardous substances: Acetic acid Pennsylvania RTK: Acetic acid Florida: Acetic acid Minnesota: Acetic acid Massachusetts RTK: Acetic acid New Jersey: Acetic acid California Director's List of Hazardous Subtances (8 CCR 339): Acetic acid TSCA 8(b) inventory: Acetic acid CERCLA: Hazardous substances.: Acetic acid: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS E: Corrosive liquid.

DSCL (EEC):
R10- Flammable. R35- Causes severe burns. S23- Do not breathe gas/fumes/vapour/spray [***] S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 2

Reactivity: 0

Personal Protection: H

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves (impervious). Synthetic apron. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 03:35 PM

Last Updated: 11/01/2010 12:00 PM

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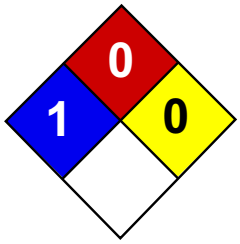

Material Safety Data Sheet
Magnesium hydroxide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Magnesium hydroxide

Catalog Codes: SLM2437, SLM3811, SLM1663

CAS#: 1309-42-8

RTECS: OM3570000

TSCA: TSCA 8(b) inventory: Magnesium hydroxide

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Mg(OH)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Magnesium hydroxide	1309-42-8	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions: No specific safety phrase has been found applicable for this product.

Storage:
No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 58.32 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: Decomposes.

Critical Temperature: Not available.

Specific Gravity: 2.36 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Not available.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Magnesium hydroxide

Other Regulations: Not available..

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
This product is not classified according to the EU regulations.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 11/01/2010 12:00 PM

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EASTMAN KODAK
2,4,6-TRINITROTOLUENE (MINIMUM 15% WATER ADDED) Revised: 08/14/1988

MSDS Contents

SECTION I. IDENTIFICATION
SECTION II. PRODUCT AND COMPONENT HAZARD DATA
SECTION III. PHYSICAL DATA
SECTION IV. FIRE AND EXPLOSION HAZARD DATA
SECTION V. REACTIVITY DATA
SECTION VI. TOXICITY AND HEALTH HAZARD DATA
SECTION VII. VENTILATION AND PERSONAL PROTECTION
SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS
SECTION IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

MATERIAL SAFETY DATA SHEET

EASTMAN KODAK COMPANY
343 State Street
Rochester, New York 14650

For Emergency Health, Safety, and Environmental Information, call 716-722-5151
For all other purposes, call 800-225-5352, in New York State call 716-458-4014

Date of Revision: 08/14/88 Kodak Accession Number: 900268

SECTION I. IDENTIFICATION

- Product Name: 2,4,6-Trinitrotoluene (Minimum 15% water added)
- Synonym(s): 2-Methyl-1,3,5-trinitrobenzene
- Formula: C7 H5 N3 O6
- CAT No(s): 104 3074; 104 3082; 842 3675
- Chem. No(s): 00268
- Kodak's Internal Hazard Rating Codes: R: 3 S: 3 F: 3 C: 4-T

SECTION II. PRODUCT AND COMPONENT HAZARD DATA

COMPONENT(S):	Percent	ACGIH TLV(R)	CAS Reg. No.
2,4,6-Trinitrotoluene	ca. 85	0.5 mg/m3 (skin)	118-96-7
Water	ca. 15	---	7732-18-5

SECTION III. PHYSICAL DATA

- Appearance: Colorless crystalline solid or cream-colored powder
- Melting Point: 81-82 C (178-180 F)
- Vapor Pressure: Negligible
- Evaporation Rate (n-butyl acetate = 1): Negligible
- Volatile Fraction by Weight: ca. 15%
- Specific Gravity (Water = 1): 1.65
- Solubility in Water (by Weight): Negligible

SECTION IV. FIRE AND EXPLOSION HAZARD DATA

- Flash Point: Not Applicable
- Extinguishing Media: Water spray; Dry chemical; Carbon dioxide
- Special Fire Fighting Procedures: Wear self-contained breathing apparatus and protective clothing. Use water spray to keep fire exposed containers cool. Fight fire from a protected location.
- Unusual Fire and Explosion Hazards: Fire or excessive heat may produce hazardous decomposition products. Flammable solid. Can be easily ignited and burns vigorously. Violent decomposition when heated under

confinement. This material in sufficient quantity and reduced particle size is capable of creating a dust explosion.

SECTION V. REACTIVITY DATA

- Stability: Stable, however, can violently decompose above 255 C. Avoid temperatures above 155 C.
- Incompatibility: Reducing materials
- Hazardous Decomposition Products: Combustion will produce carbon dioxide and probably carbon monoxide. Oxides of nitrogen may also be present.
- Hazardous Polymerization: Will not occur.

SECTION VI. TOXICITY AND HEALTH HAZARD DATA

A. EXPOSURE LIMITS: TLV 0.5 mg/m3 (skin), ACGIH 1988-89; OSHA PEL 0.5 mg/m3, skin.

B. EXPOSURE EFFECTS: Systemic overexposure can cause blood disorders and liver injury. Signs of overexposure include dizziness, weakness, nausea and breathing difficulties.
Inhalation: Harmful if inhaled. Dust irritating.
Skin: Harmful if absorbed through the skin. Causes irritation. May cause allergic skin reaction.
Eye: May cause irritation.
Ingestion: Harmful if swallowed.

C. FIRST AID:
Inhalation: Remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give exygen.
Skin: Immediately flush skin with plenty of water for at least 15 minutes. Get medical attention if symptoms are present after washing.
Eye: Immediately flush eyes with plenty of water for at least 15 minutes and get medical attention.
Ingestion: Drink 1-2 glasses of milk or water and induce vomiting. Call a physician immediately.
Note to physicians: Absorption of this product into the body leads to the formation of methemoglobin which, in sufficient concentration, causes cyanosis. Since reversion of methemoglobin to hemoglobin occurs spontaneously after termination of exposure, moderate degrees of cyanosis need be treated only by supportive measures such as bed rest and oxygen inhalation. Thorough cleansing of the entire contaminated area of the body, including scalp and nails, is of utmost importance. If cyanosis is severe, intravenous injection of mehtylene blue, one milligram per kilogram of body weight, may be of value.

SECTION VII. VENTILATION AND PERSONAL PROTECTION

A. VENTILATION:
Good general room ventilation should be used. Local exhaust may be needed to control airborne levels below recommended limits.

B. RESPIRATORY PROTECTION:
A NIOSH-approved dust respirator should be worn if needed.

C. SKIN AND EYE PROTECTION:
Protective gloves and clothing should be worn. Safety glasses, goggles, or a face shield should be worn.

SECTION VIII. SPECIAL STORAGE AND HANDLING PRECAUTIONS

Material is a flammable solid. Keep away from heat, sparks and flame. Use with adequate ventilation. Keep container closed. Fire or excessive heat may cause explosive decomposition. Keep away from fire.
Keep from contact with reducing materials. Keep container tightly closed and away from combustibles and oxidizing materials.
Since empty container retains product residue, follow label warnings even

after container is empty.
Keep container tightly closed to prevent loss of moisture.

SECTION IX. SPILL, LEAK, AND DISPOSAL PROCEDURES

Dissolve in a compatible solvent to yield a 10% solution. Dispose by incineration or contract with licensed chemical waste disposal agency. Discharge, treatment, or disposal may be subject to federal, state or local laws.

The information contained herein is furnished without warranty of any kind. Users should consider these data only as a supplement to other information gathered by them and must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of these materials and the safety and health of employees and customers.

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ABSOLUTE STANDARDS
ACETONE Revised: 01/02/2007

MSDS Contents

SECTION I
SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION
SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS
SECTION IV - FIRE AND EXPLOSION HAZARD DATA
SECTION V - REACTIVITY DATA
SECTION VI - HEALTH HAZARD DATA
SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE
SECTION VIII - CONTROL MEASURES

ABSOLUTE STANDARDS INC.
PO BOX 5585
HAMDEN, CT 06518-0585

PHONE: 203-281-2917
FAX: 203-281-2922

MATERIAL SAFETY DATA SHEET (MSDS)

MAY BE USED TO COMPLY WITH OSHA'S HAZARD COMMUNICATION STANDARD 29 CFR 1910.1200., SECTION (G)(C)(1).
STANDARD MUST BE CONSULTED FOR SPECIFIC REQUIREMENTS.
CONTACT NAME BELOW FOR FURTHER INFORMATION.

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
(NON-MANDATORY FORM)
FORM APPROVED
OMB NO.: 1218-0072

IDENTITY: ACETONE

CAS#: 00067-64-1

NOTE:
BLANK SPACES ARE NOT PERMITTED. IF ANY ITEM IS NOT APPLICABLE, OR NO INFORMATION IS AVAILABLE, THE SPACE MUST BE MARKED TO INDICATE THAT.

SECTION I

MANUFACTURER'S NAME: ABSOLUTE STANDARDS INC

ADDRESS(NUMBER, STREET, CITY, STATE, AND ZIP CODE):
44 ROSSOTTO DR.
HAMDEN CT, 06514

EMERGENCY TELEPHONE NUMBER: 1-203-281-2917

TELEPHONE NUMBER FOR INFORMATION: 1-203-281-2917

DATE PREPARED/REVISED: 1/2/07

SIGNATURE OF PREPARATOR (OPTIONAL): JACK CRISCIO

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS (SPECIFIC CHEMICAL IDENTITY; COMMON NAME(S))	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED	% (OPTIONAL)
ACETONE DIMETHYL KETONE; 2-PROPANONE; DIMETHYL	750 PPM	750 PPM	LD50(ORAL-RAT) (MG/KG)=9750	>99

SEE ATTACHED CERTIFIED WEIGHT REPORT FOR OTHER ANALYTES PRESENT AT TRACE

QUANTITIES.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 56 DEG. C

SPECIFIC GRAVITY (H2O=1): 0.79

VAPOR PRESSURE (MM HG): 181

MELTING POINT: -95 DEG. C

VAPOR DENSITY (AIR=1): 2

EVAPORATION RATE (BUTYL ACETATE=1): 14.4

SOLUBILITY IN WATER: 100%

APPEARANCE AND ODOR: CLEAR, COLORLESS LIQUID WITH CHARACTERISTIC SWEET ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED): (CLOSED CUP) -17 DEG. C

FLAMMABLE LIMITS:
LEL: 2.6%
UEL: 13.0%

AUTOIGNITION TEMPERATURE: 464 DEG. C

EXTINGUISHING MEDIA:
USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE)

SPECIAL FIREFIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.
EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE: NONE IDENTIFIED.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
VAPOR MAY FORM ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE.

TOXIC GASES PRODUCED MAY INCLUDE: CARBON MONOXIDE, CARBON DIOXIDE.

SECTION V - REACTIVITY DATA

STABILITY:
UNSTABLE: ( )
STABLE: (X)
CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID):
STRONG OXIDIZING AGENTS, STRONG ACIDS, STRONG BASES, HALOGEN ACIDS AND HALOGEN COMPOUNDS, CAUSTICS, AMINES AND AMMONIA, CHLORINE AND CHLORINE COMPOUNDS.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:
CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

HAZARDOUS POLYMERIZATION:
MAY OCCUR ( )
WILL NOT OCCUR (X)
CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY:

INHALATION?
YES

SKIN?
YES

INGESTION?
YES

HEALTH HAZARDS (ACUTE AND CHRONIC):
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE CENTRAL NERVOUS SYSTEM DEPRESSION. KIDNEY DAMAGE, LIVER DAMAGE.

TARGET ORGANS: RESPIRATORY SYSTEM, LUNGS, EYES, SKIN.

CARCINOGENICITY:

NTP?
NO

IARC MONOGRAPHS?
NO

OSHA REGULATED?
NO

REPRODUCTIVE EFFECTS: NONE IDENTIFIED

SIGNS AND SYMPTOMS OF EXPOSURE:
INHALATION AND INGESTION ARE HARMFUL AND MAY BE FATAL. INHALATION AND INGESTION MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, IRRITATION OF RESPIRATORY TRACT, COMA, GASTROINTESTINAL IRRITATION AND UNCONSCIOUSNESS. CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION. PROLONGED SKIN MAY RESULT IN DERMATITIS.

EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:
CHRONIC RESPIRATORY DISEASE, SKIN DISORDERS, EYE DISORDERS.

EMERGENCY AND FIRST AID PROCEDURE:
TREATMENT FOR ACCIDENTAL INGESTION OF A SMALL AMOUNT OF ACETONE IS UNNECESSARY.
IF A LARGE AMOUNT HAS BEEN INGESTED, ADMINISTER AN AQUEOUS CHARCOAL SLURRY.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IN CASE OF CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE REUSE.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
SHUT OFF IGNITION SOURCES:
NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS.

TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

WASTE DISPOSAL METHOD:
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D002 (TOXIC WASTE)

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINERS TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

OTHER PRECAUTIONS:
USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS. STORAGE COLOR CODE RED (FLAMMABLE).

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE):
RESPIRATORY PROTECTION REQUIRED IF AIRBOURNE CONCENTRATION EXCEEDS TLV.
AT CONCENTRATIONS ABOVE 200 PPM, A SELF CONTAINED BREATHING APPARATUS IS ADVISED.

VENTILATION:
LOCAL EXHAUST:
SPECIAL: NA
MECHANICAL (GENERAL): YES
OTHER: NA

PROTECTIVE GLOVES: YES

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: SAFETY GOGGLES

WORK/HYGIENIC PRACTICES: GOOD LABORATORY PRACTICES

NOTE:
NA = NOT APPLICABLE OR NOT AVAILABLE.

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THEREUNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY TRAINED PERSONNEL, OR SUPERVISED BY A PERSON TRAINED IN CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, ABSOLUTE STANDARDS INC. CANNOT WARN OF ALL THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR SUBSTANCES. ABSOLUTE STANDARDS INC. WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. ABSOLUTE STANDARDS INC DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR APPLICATION. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY OR DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, ABSOLUTE STANDARDS INC. WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. IF YOU HAVE ANY QUESTIONS, PLEASE CALL TECHNICAL SERVICE AT 1-203-281-2917 FOR ASSISTANCE.

ACETONE-MSDS

PRINTED: 2/5/07

ABSOLUTE STANDARDS, INC.

(800)-368-1131

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ISO 9001 QS REGISTERED
ISO 17025 QS ACCREDITED

CERTIFIED WEIGHT REPORT:

PART NUMBER: 95142

LOT NUMBER: 061008

DESCRIPTION:
PERFORMANCE EVALUATION SOIL CONC. #2
5 COMPONENTS

EXPIRATION DATE: 061011

NOMINAL CONCENTRATION (MICRO G/ML): VARIED

LOT #:

SOLVENT(S): E48E25 ACETONE

WEIGHT(S) SHOWN BELOW WERE COMBINED AND DILUTED TO (ML):
5E-05 BALANCE UNCERTAINTY

00190879

25.0 0.004 FLASK UNCERTAINTY

FORMULATED BY: JUSTIN DIPPOLD

REVIEWED BY: PEDRO L. RENTAS

DATE: 061008

MSDS INFORMATION:

COMPOUND	RM#	LOT NUMBER	NOMINAL CONC (MICRO G/ML)	PURITY	UNCERTAINTY PURITY	TARGET WEIGHT(G)
1. ALDRIN	9	122096	800	99	0.2	0.02022
2. G-BHC (LINDANE)	41	46601	488	99	0.2	0.01233
3. DIELDRIN	152	93096	1325	99	0.2	0.03349
4. ENDOSULFAN SULFATE	169	ER042406-04	1750	99	0.2	0.04423
5. HEPTACHLOR EPOXIDE	193	60197	613	98	0.2	0.01565

COMPOUND	ACTUAL WEIGHT(G)	*ACTUAL CONC (MICRO G/ML)	EXPANDED UNCERTAINTY
1. ALDRIN	0.02024	800.9	0.0064
2. G-BHC (LINDANE)	0.01235	488.7	0.0091
3. DIELDRIN	0.03352	1326.4	0.0050
4. ENDOSULFAN SULFATE	0.04425	1751.0	0.0046
5. HEPTACHLOR EPOXIDE	0.01567	613.8	0.0076

(SOLVENT SAFETY INFO. ON ATTACHED PG.)

COMPOUND	CAS	OSHA PEL(TWA)	LD50
1. ALDRIN	00309-00-2	0.25MG/M3(SKIN)	ORL-RAT 39MG/KG
2. G-BHC (LINDANE)	00058-89-9	0.5MG/M3 (SKIN)	ORL-RAT 76MG/KG
3. DIELDRIN	00060-57-1	0.25MG/M3 (SKIN)	ORL-RAT 38300(MICRO)G/KG
4. ENDOSULFAN SULFATE	01031-07-8	N/A	ORL-RAT 18MG/KG
5. HEPTACHLOR EPOXIDE	01024-57-3	N/A	ORL-RAT 47MG/KG

P#95142 L#061008.XLS

REV: 2

DATE ISSUED: 07272006

PRINTED ON: 6/11/08

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WESTERN ELECTROCHEMICAL
AMMONIUM PERCHLORATE Revised: 04/06/2004

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WESTERN ELECTROCHEMICAL CO.
P.O. BOX 629
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CEDAR CITY, UT 84721
TELEPHONE: (435)865-5000
FAX: (435)865-5005

24 HOUR EMERGENCY PHONE: (435)865-5044

AMMONIUM PERCHLORATE

DATE ISSUED: JANUARY 3, 2001

DATE REVISED: APRIL 6, 2004

MATERIAL SAFETY DATA SHEET

SECTION I-PRODUCT IDENTIFICATION

CHEMICAL NAME: AMMONIUM PERCHLORATE

COMMON NAME: AP

CHEMICAL FORMULA: NH_4ClO_4

HMIS:
HEALTH - 1
FIRE - 0
REACTIVITY - 2

SECTION II-HEALTH HAZARD INFORMATION AND FIRST AID PROCEDURES

ACUTE EFFECTS:
MODERATELY TOXIC BY INGESTION AND PARENTERAL ROUTES (INJECTION).

TOXICITY DATA:
RAT-ORAL LD50 = 4200 MG/KG
RAT-PAR-LDLO = 3500 MG/KG
RABBIT-ORAL LD50 = 1900 MG/KG
RABBIT-PAR-LDLO = 750 MG/KG

CHRONIC EFFECTS:
NO LONG-TERM HEALTH EFFECTS HAVE BEEN REPORTED. STUDIES HAVE SHOWN THAT PERCHLORATE INHIBITS IODINE UPTAKE IN THE THYROID GLAND. EPA IS CONDUCTING A RISK ASSESSMENT TO ESTABLISH A MAXIMUM CONCENTRATION LIMIT GOAL FOR DRINKING WATER. STUDIES CONDUCTED OCCUPATIONALLY HAVE INDICATED NO ADVERSE HEALTH EFFECTS ON WORKERS EXPOSED FOR YEARS TO PERCHLORATE. MINIMIZE DUSTING AND USE RESPIRATORY PROTECTION FOR ENVIRONMENTS WHERE SUBSTANTIAL DUST IS GENERATED. OVEREXPOSURE MAY RESULT IN LIMITING IODINE UPTAKE BY THE THYROID AND DEVELOPMENT OF GOITER.

CARCINOGEN:
IARC: NO
NTP: NO

OSHA: NO

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:
EXCESSIVE DUST INHALATION CAN AGGRAVATE RESPIRATORY CONDITIONS.

EMERGENCY FIRST AID PROCEDURES:

ROUTES OF EXPOSURE	SIGNS AND SYMPTOMS OF EXPOSURE	EMERGENCY AND FIRST AID PROCEDURES
SKIN:	MAY CAUSE LOCAL IRRITATION OR STINGING EFFECT.	WASH EXPOSED AREA IMMEDIATELY WITH PLENTY OF WATER. REMOVE CONTAMINATED CLOTHING AND FOOTWEAR.
INHALATION:	AIRBORNE CONCENTRATIONS OF AMMONIUM PERCHLORATE CAN AGGRAVATE PRE-EXISTING RESPIRATORY PROBLEMS.	IF EXPERIENCING BREATHING DIFFICULTIES, MOVE TO FRESH AIR. ADMINISTER OXYGEN IF EXPOSED PERSON IS UNCONSCIOUS. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.
INGESTION:	INGESTION OF LARGE QUANTITIES HAS RESULTED IN ATAXIA IN SMALL MAMMALS.	GIVE WATER. INDUCE VOMITING, KEEP AIRWAY CLEAR. SEEK MEDICAL ATTENTION.
EYES:	IRRITATION OF THE EYES WILL CAUSE STINGING EFFECT.	FLUSH EYES WITH FRESH WATER FOR AT LEAST 15 MINUTES AND MOVE EXPOSED PERSON TO A NON-CONTAMINATED AREA.

SECTION III-HAZARDOUS COMPONENTS AND OCCUPATIONAL

		EXPOSURE LIMITS	
HAZARDOUS COMPONENTS	CAS	OSHA PEL TWA	ACGIH TWA
AMMONIUM PERCHLORATE	7790-98-9	15 MG/M3 (NUISANCE DUST)	10 MG/M3 (NUISANCE DUST)

SECTION IV-PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: N/A

VAPOR PRESSURE: N/A

VAPOR DENSITY: N/A

SPECIFIC GRAVITY (H2O=1): 1.95

MELTING POINT: DECOMPOSES AT 270 TO 300 DEG. C

EVAPORATION RATE: N/A

SOLUBILITY IN WATER: 20.8 G/100 ML AT 20 DEG. C

APPEARANCE AND ODOR: WHITE CRYSTAL, NO ODOR.

SECTION V-FIRE AND EXPLOSION DATA

FLASH POINT (METHOD USED): N/A

FLAMMABLE LIMITS:
LEL: N/A
UEL: N/A

EXTINGUISHING MEDIA: WATER

SPECIAL FIRE FIGHTING PROCEDURES:
DO NOT FIGHT FIRES INVOLVING MIXTURES OF AMMONIUM PERCHLORATE AND FUELS. AMMONIUM PERCHLORATE IS AN OXIDIZING AGENT AND MAY CAUSE RAPID COMBUSTION OR EXPLOSIONS IF MIXED WITH FUELS. BURNING AMMONIUM PERCHLORATE PRODUCES CHLORINE AND CHLORINE DIOXIDE. KEEP UPWIND OR WEAR SELF-CONTAINED BREATHING APPARATUS WHEN ATTEMPTING TO RESCUE.

SECTION VI-REACTIVITY DATA

STABILITY:
UNSTABLE: ( )
STABLE: (X)

CONDITIONS TO AVOID:
DO NOT MIX WITH REDUCING AGENTS, METAL POWDERS OR POWDERED CARBON. AVOID ELEVATED TEMPERATURES OVER 270 DEG. C, WHICH CAN CAUSE SPONTANEOUS EXOTHERMIC DECOMPOSITION. CLOTH FABRIC SUCH AS DUST COLLECTOR BAGS INTIMATELY CONTAMINATED WITH AMMONIUM PERCHLORATE IS SUBJECT TO IGNITION THROUGH FRICTION OR IMPACT. HIGH-ENERGY STATIC ELECTRICITY MAY ALSO SERVE AS AN IGNITION SOURCE.

INCOMPATIBILITY (MATERIALS TO AVOID):
SULFURIC ACID, POWDERED METALS, AND INTIMATE MIXTURES WITH ORGANICS.

HAZARDOUS DECOMPOSITION OR BYPRODUCTS: CHLORINE AND CHLORINE DIOXIDE.

HAZARDOUS POLYMERIZATION: HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII-ENVIRONMENTAL PROCEDURES

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:
SWEEP UP MATERIAL AND CONTAINERIZE. CLEAN CONTAMINATED FLOOR SURFACE WITH WATER.

WASTE DISPOSAL METHOD:
DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REGULATIONS.

SECTION VIII-SPECIAL PROTECTION/EXPOSURE CONTROL MEASURES

VENTILATION REQUIREMENTS:
VENTILATE AS NECESSARY TO MINIMIZE EXPOSURE LEVELS. INSPECT AND CLEAN VENTILATION SYSTEMS REGULARLY.

EYE PROTECTION: WEAR SAFETY GLASSES.

PROTECTIVE GLOVES:
PLASTIC, RUBBER OR LATEX GLOVES ARE RECOMMENDED.
LEATHER OR COTTON GLOVES SHOULD NOT BE USED.

RESPIRATORY PROTECTION:
NONE GENERALLY REQUIRED. PROTECT FROM NUISANCE DUST, IF NECESSARY DURING HANDLING OR USAGE.

OTHER CLOTHING AND EQUIPMENT:
WEAR IMPERVIOUS APRONS OR RAIN GEAR TO REDUCE CONTAMINATION OF COTTON OR OTHER FIBER CLOTHING.

PERSONAL HYGIENE AND WORK PRACTICES:
AVOID CONTAMINATION OF COTTON OR OTHER ABSORBENT MATERIAL. DO NOT WEAR ANY WORK CLOTHING THAT HAS BECOME CONTAMINATED WITH AMMONIUM PERCHLORATE. REMOVE CONTAMINATED CLOTHING IMMEDIATELY AND KEEP WET UNTIL THOROUGHLY WASHED. SHOWERING IS RECOMMENDED AFTER HANDLING ANY INDUSTRIAL CHEMICAL.

SECTION IX-PRECAUTIONS FOR SAFE HANDLING AND STORAGE

HANDLING AND STORAGE PRECAUTIONS:

STORE AWAY FROM COMBUSTIBLES AND FLAMMABLES. KEEP CONTAINER CLOSED WHEN NOT IN USE. CONTROL STATIC ELECTRICITY AND OTHER IGNITION SOURCES. STORE IN DRY AREAS AWAY FROM SOURCES OF EXTREME HEAT.

SPECIAL MIXING AND HANDLING INSTRUCTIONS:
GROUND AND BOND PROCESS EQUIPMENT. MIXING AMMONIUM PERCHLORATE WITH FUELS OF ANY TYPE MAY RESULT IN RAPID COMBUSTION OR EXPLOSIONS. WHEN HANDLING MATERIALS CONTAMINATED WITH AMMONIUM PERCHLORATE SUCH AS DUST COLLECTOR BAGS OR ANY OTHER COMBUSTIBLE MATERIAL, THOROUGHLY WET THE BAGS WITH WATER BEFORE HANDLING, KEEP THE BAGS WET WHILE HANDLING, AND USE NON-SPARKING TOOLS OR TOOLS COATED WITH NON-SPARKING MATERIAL IF NON-SPARKING TOOLS ARE NOT AVAILABLE. AVOID FRICTION, IMPACT, OR STATIC ELECTRICITY IGNITION SOURCES WHEN ORGANIC MATERIALS ARE CONTAMINATED WITH AMMONIUM PERCHLORATE. FIRE RESISTANT FABRICS DO NOT REDUCE THE HAZARD.

SECTION X-TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOT SHIPPING NAME: AMMONIUM PERCHLORATE

UN NUMBER: 1442

DOT HAZARD CLASS: OXIDIZER 5.1

CAS NUMBER: 7790-98-9

NOTE:
AMPAC, THE PARENT OF WESTERN ELECTROCHEMICAL COMPANY HAS PERFORMED TESTS AS REQUIRED AND APPLIED TO DOT AND RECEIVED APPROVALS LISTED AT THE RIGHT FOR VARIOUS GRADES OF AP AS 5.1 OXIDIZER AS SHOWN TO THE RIGHT. OTHER AP DOES NOT AUTOMATICALLY MEET THIS CLASSIFICATION AND WOULD REQUIRE TESTING AND DOT APPROVAL TO ACHIEVE A 5.1 OXIDIZER CLASS AS COVERED IN 49CFR172 HAZARDOUS MATERIALS TABLE WITH SPECIAL PROVISION 107 FOR AMMONIUM PERCHLORATE AND SUBSEQUENT INFORMATION COVERED IN NOTE 107 AT 49 CFR172.102. THIS REQUIREMENT IS SUPPLEMENTED BY 49 CFR173.57 AND 173.58 AS DESCRIBED IN NOTE 107. THESE EXEMPTIONS ARE SPECIFIC TO THE FACILITY LOCATED AT 10622 WEST 6400 NORTH, CEDAR CITY, UTAH 84720

AMMONIUM PERCHLORATE PROPELLANT GRADE 170 MICRON AND GREATER HAS RECEIVED CLASSIFICATION AS A 5.1 OXIDIZER UNDER EX 2003110036.

AMMONIUM PERCHLORATE PROPELLANT GRADE WITH AVERAGE PARTICLE SIZE OF 70 MICRONS AND LARGER

AMMONIUM PERCHLORATE WETTED WITH NOT LESS THAN 5% WATER HAS RECEIVED CLASSIFICATION AS A 5.1 OXIDIZER UNDER EX2004020234

BOTH EXEMPTIONS HAVE CONTAINER AND WEIGHT RESTRICTIONS AND ARE NOT DIRECTLY TRANSFERABLE TO ANY OTHER PARTIES WITHOUT APPLICATION TO AND APPROVAL OF DOT THROUGH THE RSPA OFFICE.

CAS = CHEMICAL ABSTRACT SERVICE NUMBER
TWA = 8-HOUR TIME WEIGHTED AVERAGE
PEL = OSHA PERMISSIBLE EXPOSURE LIMIT
N/A = NOT APPLICABLE

IMPORTANT:
THE INFORMATION PRESENTED HEREIN, WHILE NOT GUARANTEED, WAS PREPARED BY COMPETENT TECHNICAL PERSONNEL AND IS TRUE AND ACCURATE TO THE BEST OF OUR KNOWLEDGE. NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, IS MADE REGARDING PERFORMANCE, STABILITY OR OTHERWISE. THIS INFORMATION IS NOT INTENDED TO BE ALL-INCLUSIVE AS TO THE MANNER AND CONDITIONS OF USE, HANDLING AND STORAGE. OTHER FACTORS MAY INVOLVE OTHER OR ADDITIONAL SAFETY OR PERFORMANCE CONSIDERATIONS. WHILE OUR TECHNICAL PERSONNEL WILL BE HAPPY TO RESPOND TO QUESTIONS REGARDING SAFE HANDLING AND USE PROCEDURES, SAFE HANDLING AND USE REMAINS THE RESPONSIBILITY OF THE CUSTOMER. NO SUGGESTIONS FOR USE ARE INTENDED AS, AND NOTHING HEREIN SHALL BE CONSTRUED AS A RECOMMENDATION TO INFRINGE ANY EXISTING PATENTS OR VIOLATE ANY FEDERAL, STATE OR LOCAL LAWS.

FORM: W-MS-01

DOC ID: 960113

REV: 07

REVISION DATE: APRIL 6, 2004

MATERIAL SAFETY DATA SHEET-AMMONIUM PERCHLORATE

A&K PETRO-CHEM CANADA
HYDROCHLORIC ACID Revised: 06/13/2007

MSDS Contents

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TOXICOLOGICAL AND HEALTH DATA
PREVENTATIVE MEASURES
TDG: SHIPPING INFORMATION

MSDS

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EMERGENCY NUMBERS:
CANUTEC: (613) 996-6666
POISON CONTROL CENTRE: 598-5900

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

PRODUCT NAME: HYDROCHLORIC ACID

CHEMICAL NAME: HYDROCHLORIC ACID

SYNONYMS: MURIATIC ACID, HYDROGEN CHLORIDE SOLUTION

CHEMICAL FAMILY: INORGANIC ACIDS, MINERAL ACIDS

MOLECULAR FORMULA: HCl IN H2O

HAZARDOUS INGREDIENTS OF MATERIALS

NAME	%	LD50 (OR LC50)	TLV/TWA (MG/M3)	CAS NO.
HYDROCHLORIC ACID	30-40	ORAL, RAT = 900 MG/KG	7 (5 PPM)	7647-01-0

PHYSICAL PROPERTIES

APPEARANCE AND ODOR: CLEAR, COLORLESS LIQUID WITH HYDROGEN CHLORIDE ODOR.

BOILING POINT/RANGE: 149 C

MELTING/FREEZING POINT: -25 C

VAPOR PRESSURE: NOT APPLICABLE

SPECIFIC GRAVITY: 1.18

VAPOR DENSITY: NOT APPLICABLE

EVAPORATION RATE: NOT APPLICABLE

SOLUBILITY: MISCIBLE IN ALL PROPORTIONS

% VOLATILE BY VOLUME: 100 (@ 21 C)

pH: 1.0 (0.1 M SOLN)

FIRST AID PROCEDURES

INHALATION: REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION.

CONTACT WITH SKINS:
FLUSH AFFECTED AREA WITH RUNNING WATER FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING AND SHOES.

CONTACT WITH EYES: FLUSH EYES WITH RUNNING WATER FOR AT LEAST 15 MINUTES.

INGESTION:
DO NOT INDUCE VOMITING; IF CONSCIOUS, GIVE WATER, MILK, OR MILK OF MAGNESIA.

OTHER MEDICAL CARE: CALL A PHYSICIAN

REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR.

CONDITIONS TO AVOID: HIGH TEMPERATURES

MATERIALS TO AVOID:
STRONG BASES, MOST COMMON METALS, AMINES, CARBONATES, SULFURIC ACID, CHLOROSULFONIC ACID, METAL OXIDES.

HAZARDOUS DECOMPOSITION OR COMBUSTION PRODUCTS:
HYDROGEN CHLORIDE, HYDROGEN CHLORINE

FIRE AND EXPLOSION DATA

FLASH POINT (METHOD): NON-FLAMMABLE

AUTOIGNITION POINT: NOT APPLICABLE

FLAMMABILITY LIMITS IN AIR:
UEL (%): NOT APPLICABLE
LEL (%): NOT APPLICABLE

FIRE EXTINGUISHING MEDIA: USE APPROPRIATE MEDIA TO EXTINGUISH SURROUNDING FIRE.

FIRE FIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

OTHER FIRE OR EXPLOSION HAZARDS:
REACTS WITH MOST METALS TO PRODUCE HYDROGEN GAS, WHICH CAN FORM AN EXPLOSIVE MIXTURE WITH AIR. PRODUCES HYDROGEN CHLORIDE AND HYDROGEN GASES.

TOXICOLOGICAL AND HEALTH DATA

RECOMMENDED EXPOSURE LIMIT (ACGIH TLV-TWA):
TLV: 7 MG/M3 (5 PPM)
PEL: 7 MG/M3 (5 PPM)
THERE IS NO STEL VALUE.

TOXICOLOGICAL DATA:
LD50 (ORAL, RABBIT): 900 MG/KG
LD50 (IPR, MOUSE): 40 MG/KG

LC50 (INHL-RAT-1H): 3124 PPM.

CARCINOGENICITY DATA:
THE INGREDIENTS OF THIS PRODUCT ARE NOT LISTED AS CARCINOGENS BY NTP (NATIONAL TOXICOLOGY PROGRAM) NOR THE Z-LIST, NOT REGULATED AS CARCINOGENS BY OSHA (OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION), AND HAVE NOT BEEN EVALUATED BY IARC (INTERNATIONAL AGENCY FOR RESEARCH ON CANCER), OR ACGIH (AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGIENISTS).

REPRODUCTIVE EFFECTS:
NO INFORMATION IS AVAILABLE AND NO ADVERSE REPRODUCTIVE EFFECTS ARE ANTICIPATED.

MUTAGENICITY DATA:
NO INFORMATION IS AVAILABLE AND NO ADVERSE MUTAGENIC EFFECTS ARE ANTICIPATED.

TERATOGENICITY DATA:
NO INFORMATION IS AVAILABLE AND NO ADVERSE TERATOGENIC EFFECTS ARE ANTICIPATED.

SYNERGISTIC MATERIALS: NONE KNOWN

EFFECTS OF EXPOSURE FROM:

INHALATION:
INHALATION OF VAPORS MAY CAUSE COUGHING AND DIFFICULT BREATHING, PULMONARY EDEMA, CIRCULATORY SYSTEM COLLAPSE, DAMAGE TO UPPER RESPIRATORY SYSTEM, AND COLLAPSE.

SKIN CONTACT: LIQUID MAY CAUSE SEVERE BURNS.

EYE CONTACT: LIQUID MAY CAUSE SEVERE BURNS.

INGESTION:
IS HARMFUL AND EVEN FATAL, MAY CAUSE SEVERE BURNS OF THE MOUTH, THROAT, AND STOMACH, NAUSEA, AND VOMITING.

OTHER HEALTH EFFECTS:
MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: NONE IDENTIFIED.

PREVENTATIVE MEASURES

ENGINEERING CONTROLS: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV

RESPIRATORY PROTECTION:
AT CONCENTRATIONS UP TO 100 PPM, USE CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE DESIGNATED.

SKIN PROTECTION:
WEAR NEOPRENE GLOVES, PROTECTIVE UNIFORM/APRON ALONG WITH NEOPRENE BOOTS DESIGNATED FOR ACID RESISTANCE.

EYE PROTECTION: SAFETY GOGGLES WITH SIDE PANELS PLUS FULL FACE SHIELD.

OTHER PERSONAL PROTECTIVE EQUIPMENT:
SAFETY SHOWER, EYE BATH AND WASHING FACILITIES SHOULD BE CLOSE BY.

HANDLING PROCEDURES AND EQUIPMENT:
THE USUAL EQUIPMENT ASSOCIATED WITH CORROSIVE ACIDS

STORAGE REQUIREMENTS:
KEEP CONTAINER TIGHTLY CLOSED. STORE IN CORROSION-PROOF AREA. ISOLATE FROM INCOMPATIBLE MATERIALS.

OTHER PRECAUTIONS: NOT APPLICABLE

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR LEAK:

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH LIME. WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

ENVIRONMENTAL EFFECTS: NOT APPLICABLE

DEACTIVATING CHEMICALS: NOT APPLICABLE

WASTE DISPOSAL METHODS:
CONSULT FEDERAL, PROVINCIAL, STATE, AND LOCAL REGULATIONS ON CHEMICAL WASTE DISPOSAL.

TDG: SHIPPING INFORMATION

SHIPPING NAME: HYDROCHLORIC ACID SOLUTION

SHIPPING CLASS: 8

UN: 1789

PACKING GROUP: II

WHMIS CLASS: D1A, E

DATE ISSUED: FEBRUARY 3, 1989

DATE REVISED: JUNE 13, 2007

PREPARED BY: THOMAS KYRON

MSDS INDEX NO.:

THE INFORMATION SET FORTH HEREIN HAS BEEN GATHERED FROM STANDARD REFERENCE MATERIALS AND/OR A & K PETROCHEM INDUSTRIES LTD TEST DATA AND IS TO THE BEST KNOWLEDGE AND BELIEF OF A & K PETROCHEM INDUSTRIES LTD ACCURATE AND RELIABLE. SUCH INFORMATION IS OFFERED SAFETY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION, AND IT IS NOT SUGGESTED OR GUARANTEED THAT THE HAZARD PRECAUTIONS OR PROCEDURES MENTIONED ARE THE ONLY ONES WHICH EXIST. A & K PETROCHEM INDUSTRIES LTD MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE USE OF SUCH INFORMATION OR THE USE OF THE SPECIFIC MATERIAL IDENTIFIED HEREIN IN COMBINATION WITH ANY OTHER MATERIAL OR PROCESS, AND ASSUMES NO RESPONSIBILITY THEREFORE.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

LEAD

CAS # 7439-92-1

Division of Toxicology and Environmental Medicine ToxFAQs™ August 2007

This fact sheet answers the most frequently asked health questions (FAQs) about lead. For more information, call the ATSDR Information Center at 1-800-232-4636. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to lead can happen from breathing workplace air or dust, eating contaminated foods, or drinking contaminated water. Children can be exposed from eating lead-based paint chips or playing in contaminated soil. Lead can damage the nervous system, kidneys, and reproductive system. Lead has been found in at least 1,272 of the 1,684 National Priority List sites identified by the Environmental Protection Agency (EPA).

What is lead?

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. Lead can be found in all parts of our environment. Much of it comes from human activities including burning fossil fuels, mining, and manufacturing.

Lead has many different uses. It is used in the production of batteries, ammunition, metal products (solder and pipes), and devices to shield X-rays. Because of health concerns, lead from paints and ceramic products, caulking, and pipe solder has been dramatically reduced in recent years. The use of lead as an additive to gasoline was banned in 1996 in the United States.

What happens to lead when it enters the environment?

- ❏ Lead itself does not break down, but lead compounds are changed by sunlight, air, and water.
- ❏ When lead is released to the air, it may travel long distances before settling to the ground.
- ❏ Once lead falls onto soil, it usually sticks to soil particles.
- ❏ Movement of lead from soil into groundwater will depend on the type of lead compound and the characteristics of the soil.

How might I be exposed to lead?

- ❏ Eating food or drinking water that contains lead. Water pipes in some older homes may contain lead solder. Lead can leach out into the water.
- ❏ Spending time in areas where lead-based paints have been used and are deteriorating. Deteriorating lead paint can contribute to lead dust.
- ❏ Working in a job where lead is used or engaging in certain hobbies in which lead is used, such as making stained glass.
- ❏ Using health-care products or folk remedies that contain lead.

How can lead affect my health?

The effects of lead are the same whether it enters the body through breathing or swallowing. Lead can affect almost every organ and system in your body. The main target for lead toxicity is the nervous system, both in adults and children. Long-term exposure of adults can result in decreased performance in some tests that measure functions of the nervous system. It may also cause weakness in fingers, wrists, or ankles. Lead exposure also causes small increases in blood pressure, particularly in middle-aged and older people and can cause anemia. Exposure to high lead levels can severely damage the brain and kidneys in adults or children and ultimately cause death. In pregnant women, high levels of exposure to lead may cause miscarriage. High-level exposure in men can damage the organs responsible for sperm production.

How likely is lead to cause cancer?

We have no conclusive proof that lead causes cancer in humans. Kidney tumors have developed in rats and mice that had been given large doses of some kind of lead compounds. The Department of Health and Human Services

(DHHS) has determined that lead and lead compounds are reasonably anticipated to be human carcinogens and the EPA has determined that lead is a probable human carcinogen. The International Agency for Research on Cancer (IARC) has determined that inorganic lead is probably carcinogenic to humans and that there is insufficient information to determine whether organic lead compounds will cause cancer in humans.

How can lead affect children?

Small children can be exposed by eating lead-based paint chips, chewing on objects painted with lead-based paint, or swallowing house dust or soil that contains lead.

Children are more vulnerable to lead poisoning than adults. A child who swallows large amounts of lead may develop blood anemia, severe stomachache, muscle weakness, and brain damage. If a child swallows smaller amounts of lead, much less severe effects on blood and brain function may occur. Even at much lower levels of exposure, lead can affect a child's mental and physical growth.

Exposure to lead is more dangerous for young and unborn children. Unborn children can be exposed to lead through their mothers. Harmful effects include premature births, smaller babies, decreased mental ability in the infant, learning difficulties, and reduced growth in young children. These effects are more common if the mother or baby was exposed to high levels of lead. Some of these effects may persist beyond childhood.

How can families reduce the risks of exposure to lead?

❑ Avoid exposure to sources of lead.

❑ Do not allow children to chew or mouth surfaces that may have been painted with lead-based paint.

❑ If you have a water lead problem, run or flush water that has been standing overnight before drinking or cooking with it.

❑ Some types of paints and pigments that are used as make-up or hair coloring contain lead. Keep these kinds of products away from children

❑ If your home contains lead-based paint or you live in an area contaminated with lead, wash children's hands and faces often to remove lead dusts and soil, and regularly clean the house of dust and tracked in soil.

Is there a medical test to determine whether I've been exposed to lead?

A blood test is available to measure the amount of lead in your blood and to estimate the amount of your recent exposure to lead. Blood tests are commonly used to screen children for lead poisoning. Lead in teeth or bones can be measured by X-ray techniques, but these methods are not widely available. Exposure to lead also can be evaluated by measuring erythrocyte protoporphyrin (EP) in blood samples. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter (μg/dL). These tests usually require special analytical equipment that is not available in a doctor's office. However, your doctor can draw blood samples and send them to appropriate laboratories for analysis.

Has the federal government made recommendations to protect human health?

The Centers for Disease Control and Prevention (CDC) recommends that states test children at ages 1 and 2 years. Children should be tested at ages 3–6 years if they have never been tested for lead, if they receive services from public assistance programs for the poor such as Medicaid or the Supplemental Food Program for Women, Infants, and Children, if they live in a building or frequently visit a house built before 1950; if they visit a home (house or apartment) built before 1978 that has been recently remodeled; and/or if they have a brother, sister, or playmate who has had lead poisoning. CDC considers a blood lead level of 10 μg/dL to be a level of concern for children.

EPA limits lead in drinking water to 15 μg per liter.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological Profile for lead (Update). Atlanta, GA: U.S. Department of Public Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology and Environmental Medicine, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-800-232-4636, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

MERCURY
CAS # 7439-97-6

Agency for Toxic Substances and Disease Registry ToxFAQs **April 1999**

This fact sheet answers the most frequently asked health questions (FAQs) about mercury. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It's important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to mercury occurs from breathing contaminated air, ingesting contaminated water and food, and having dental and medical treatments. Mercury, at high levels, may damage the brain, kidneys, and developing fetus. This chemical has been found in at least 714 of 1,467 National Priorities List sites identified by the Environmental Protection Agency.

What is mercury?

(Pronounced mŭr′kyə-rē)

Mercury is a naturally occurring metal which has several forms. The metallic mercury is a shiny, silver-white, odorless liquid. If heated, it is a colorless, odorless gas.

Mercury combines with other elements, such as chlorine, sulfur, or oxygen, to form inorganic mercury compounds or "salts," which are usually white powders or crystals. Mercury also combines with carbon to make organic mercury compounds. The most common one, methylmercury, is produced mainly by microscopic organisms in the water and soil. More mercury in the environment can increase the amounts of methylmercury that these small organisms make.

Metallic mercury is used to produce chlorine gas and caustic soda, and is also used in thermometers, dental fillings, and batteries. Mercury salts are sometimes used in skin lightening creams and as antiseptic creams and ointments.

What happens to mercury when it enters the environment?

- Inorganic mercury (metallic mercury and inorganic mercury compounds) enters the air from mining ore deposits, burning coal and waste, and from manufacturing plants.
- It enters the water or soil from natural deposits, disposal of wastes, and volcanic activity.
- Methylmercury may be formed in water and soil by small organisms called bacteria.
- Methylmercury builds up in the tissues of fish. Larger and older fish tend to have the highest levels of mercury.

How might I be exposed to mercury?

- Eating fish or shellfish contaminated with methylmercury.
- Breathing vapors in air from spills, incinerators, and industries that burn mercury-containing fuels.
- Release of mercury from dental work and medical treatments.
- Breathing contaminated workplace air or skin contact during use in the workplace (dental, health services, chemical, and other industries that use mercury).
- Practicing rituals that include mercury.

How can mercury affect my health?

The nervous system is very sensitive to all forms of mercury. Methylmercury and metallic mercury vapors are more harmful than other forms, because more mercury in these forms reaches the brain. Exposure to high levels of metallic, inorganic, or organic mercury can permanently damage the brain, kidneys, and developing fetus. Effects on brain functioning may result in irritability, shyness, tremors, changes in vision or hearing, and memory problems.

Short-term exposure to high levels of metallic mercury vapors may cause effects including lung damage, nausea,

vomiting, diarrhea, increases in blood pressure or heart rate, skin rashes, and eye irritation.

How likely is mercury to cause cancer?

There are inadequate human cancer data available for all forms of mercury. Mercuric chloride has caused increases in several types of tumors in rats and mice, and methylmercury has caused kidney tumors in male mice. The EPA has determined that mercuric chloride and methylmercury are possible human carcinogens.

How can mercury affect children?

Very young children are more sensitive to mercury than adults. Mercury in the mother's body passes to the fetus and may accumulate there. It can also can pass to a nursing infant through breast milk. However, the benefits of breast feeding may be greater than the possible adverse effects of mercury in breast milk.

Mercury's harmful effects that may be passed from the mother to the fetus include brain damage, mental retardation, incoordination, blindness, seizures, and inability to speak. Children poisoned by mercury may develop problems of their nervous and digestive systems, and kidney damage.

How can families reduce the risk of exposure to mercury?

Carefully handle and dispose of products that contain mercury, such as thermometers or fluorescent light bulbs. Do not vacuum up spilled mercury, because it will vaporize and increase exposure. If a large amount of mercury has been spilled, contact your health department. Teach children not to play with shiny, silver liquids.

Properly dispose of older medicines that contain mercury. Keep all mercury-containing medicines away from children.

Pregnant women and children should keep away from rooms where liquid mercury has been used.

Learn about wildlife and fish advisories in your area from your public health or natural resources department.

Is there a medical test to show whether I've been exposed to mercury?

Tests are available to measure mercury levels in the body. Blood or urine samples are used to test for exposure to metallic mercury and to inorganic forms of mercury. Mercury in whole blood or in scalp hair is measured to determine exposure to methylmercury. Your doctor can take samples and send them to a testing laboratory.

Has the federal government made recommendations to protect human health?

The EPA has set a limit of 2 parts of mercury per billion parts of drinking water (2 ppb).

The Food and Drug Administration (FDA) has set a maximum permissible level of 1 part of methylmercury in a million parts of seafood (1 ppm).

The Occupational Safety and Health Administration (OSHA) has set limits of 0.1 milligram of organic mercury per cubic meter of workplace air (0.1 mg/m^3) and 0.05 mg/m^3 of metallic mercury vapor for 8-hour shifts and 40-hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 1999. Toxicological profile for mercury. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

ABSOLUTE STANDARDS
METHYLENE CHLORIDE Revised: 01/01/2004

MSDS Contents

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SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE
SECTION VIII - CONTROL MEASURES

ABSOLUTE STANDARDS INC.
PO BOX 5585
HAMDEN, CT 06518-0585

PHONE: 203-281-2917

FAX: 203-281-2922

MATERIAL SAFETY DATA SHEET (MSDS)

MAY BE USED TO COMPLY WITH OSHA'S HAZARD COMMUNICATION STANDARD
29 CFR 1910.1200., SECTION (G)(C)(1).

STANDARD MUST BE CONSULTED FOR SPECIFIC REQUIREMENTS.

U.S. DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
(NON-MANDATORY FORM)

FORM APPROVED
OMB NO.: 1218-0072

CONTACT NAME BELOW FOR FURTHER INFORMATION.

IDENTITY:
METHYLENE CHLORIDE
CAS #: 00075-09-2

NOTE:
BLANK SPACES ARE NOT PERMITTED. IF ANY ITEM IS NOT APPLICABLE, OR NO INFORMATION IS AVAILABLE, THE SPACE MUST BE MARKED TO INDICATE THAT.

SECTION I

MANUFACTURER'S NAME: ABSOLUTE STANDARDS INC

ADDRESS (NUMBER, STREET, CITY, STATE, AND ZIP CODE):
44 ROSSOTTO DR.
HAMDEN CT, 06514

EMERGENCY TELEPHONE NUMBER: 1-203-281-2917

TELEPHONE NUMBER FOR INFORMATION: 1-203-281-2917

DATE PREPARED/REVISED: 1/1/04

SIGNATURE OF PREPARATOR (OPTIONAL): JACK CRISCIO

SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

HAZARDOUS COMPONENTS (SPECIFIC CHEMICAL IDENTITY; COMMON NAME(S))	OSHA PEL	ACGIH TLV	OTHER LIMITS RECOMMENDED	% (OPTIONAL)
METHYLENE CHLORIDE DICHLOROMETHANE	25 PPM	350 MG/M3	NA	>97

SEE ATTACHED CERTIFIED WEIGHT REPORT FOR OTHER ANALYTES PRESENT AT TRACE QUANTITIES.

SECTION III - PHYSICAL/CHEMICAL CHARACTERISTICS

BOILING POINT: 40 DEG. C

SPECIFIC GRAVITY (H2O = 1): 1.32

VAPOR PRESSURE (MMHg): 350

MELTING POINT: -95 DEG. C

VAPOR DENSITY (AIR = 1): 2.9

EVAPORATION RATE (BUTYL ACETATE = 1): 27.5

SOLUBILITY IN WATER: MODERATE (1-10%)

APPEARANCE AND ODOR:
CLEAR, COLORLESS LIQUID WITH CHARACTERISTIC PENETRATING ETHER-LIKE ODOR.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (METHOD USED) (CLOSED CUP): NA

FLAMMABLE LIMITS:
LEL: 12%
UEL: 19%

EXTINGUISHING MEDIA: USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE.

SPECIAL FIREFIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE AND EXPLOSION HAZARDS:
VAPOR MAY FORM FLAMMABLE MIXTURE IN ATMOSPHERE THAT CONTAINS A HIGH PERCENTAGE OF OXYGEN. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. BURNS WITH A CLEAR, ALMOST INVISIBLE FLAME. CONCENTRATED VAPOR CAN BE IGNITED BY A HIGH INTENSITY IGNITION SOURCE.

TOXIC GASES PRODUCED MAY INCLUDE:
HYDROGEN CHLORIDE, PHOSGENE, CHLORINE, CARBON MONOXIDE, CARBON DIOXIDE.

SECTION V - REACTIVITY DATA

STABILITY:
UNSTABLE ( )
STABLE (X)

CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

INCOMPATIBILITY (MATERIALS TO AVOID):
STRONG OXIDIZING AGENTS, STRONG ACIDS, ZINC, ALUMINUM, MAGNESIUM

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS:
CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

HAZARDOUS POLYMERIZATION:
MAY OCCUR ( )
WILL NOT OCCUR (X)

CONDITIONS TO AVOID: HEAT, FLAME, OTHER IGNITION SOURCES.

SECTION VI - HEALTH HAZARD DATA

ROUTE(S) OF ENTRY:
INHALATION?: YES
SKIN?: YES
INGESTION?: YES

HEALTH HAZARDS (ACUTE AND CHRONIC):
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE, LUNGS, BLOOD, OR CENTRAL NERVOUS SYSTEM.

CARCINOGENICITY:
NTP?: NO
IARC MONOGRAPHS?: YES
OSHA REGULATED?: NO

SIGNS AND SYMPTOMS OF EXPOSURE:
INHALATION AND INGESTION ARE HARMFUL AND MAY BE FATAL. INHALATION AND INGESTION MAY CAUSE HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, SUFFOCATION, LOWER BLOOD PRESSURE, CENTRAL NERVOUS SYSTEM DEPRESSION. CONTACT WITH SKIN OR EYES MAY CAUSE IRRITATION. PROLONGED SKIN MAY RESULT IN DERMATITIS. EYE CONTACT MAY RESULT IN TEMPORARY CORNEAL DAMAGE.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:
EYE DISORDERS, SKIN DISORDERS, LIVER OR KIDNEY DISORDERS, CARDIOVASCULAR DISORDERS, HEART DISORDERS, CENTRAL NERVOUS SYSTEM DISORDERS, HEAVY DRINKERS, AND HEAVY SMOKERS.

EMERGENCY AND FIRST AID PROCEDURE:
CALL A PHYSICIAN. IF SWALLOWED, DO NOT INDUCE VOMITING.

IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE REUSE.

WARNING:
THIS PRODUCT IS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

SECTION VII - PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED:
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

SHUT OFF IGNITION SOURCES:
NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

WASTE DISPOSAL METHOD:
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL ENVIRONMENTAL REGULATIONS.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:
BOND AND GROUND CONTAINERS WHEN TRANSFERRING LIQUID. KEEP CONTAINERS TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

OTHER PRECAUTIONS:
USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.
STORAGE COLOR CODE BLUE HEALTH.

SECTION VIII - CONTROL MEASURES

RESPIRATORY PROTECTION (SPECIFY TYPE):
RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS ABOVE 125 PPM, A SELF CONTAINED BREATHING APPARATUS IS ADVISED.

VENTILATION:
LOCAL EXHAUST:
MECHANICAL (GENERAL): YES
SPECIAL: NA
OTHER: NA

PROTECTIVE GLOVES: YES

OTHER PROTECTIVE CLOTHING OR EQUIPMENT: SAFETY GOGGLES

WORK/HYGIENIC PRACTICES: GOOD LABORATORY PRACTICES

NOTE:
NA = NOT APPLICABLE OR NOT AVAILABLE.

THE INFORMATION IN THIS MATERIAL SAFETY DATA SHEET MEETS THE REQUIREMENTS OF THE UNITED STATES OCCUPATIONAL SAFETY AND HEALTH ACT AND REGULATIONS PROMULGATED THERE UNDER (29 CFR 1910.1200 ET. SEQ.) AND THE CANADIAN WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM. THIS DOCUMENT IS INTENDED ONLY AS A GUIDE TO THE APPROPRIATE PRECAUTIONARY HANDLING OF THE MATERIAL BY TRAINED PERSONNEL, OR SUPERVISED BY A PERSON TRAINED IN CHEMICAL HANDLING. THE USER IS RESPONSIBLE FOR DETERMINING THE PRECAUTIONS AND DANGERS OF THIS CHEMICAL FOR HIS OR HER PARTICULAR APPLICATION. DEPENDING ON USAGE, PROTECTIVE CLOTHING INCLUDING EYE AND FACE GUARDS AND RESPIRATORS MUST BE USED TO AVOID CONTACT WITH MATERIAL OR BREATHING CHEMICAL VAPORS/FUMES. EXPOSURE TO THIS PRODUCT MAY HAVE SERIOUS ADVERSE HEALTH EFFECTS. THIS CHEMICAL MAY INTERACT WITH OTHER SUBSTANCES. SINCE THE POTENTIAL USES ARE SO VARIED, ABSOLUTE STANDARDS INC. CANNOT WARN OF ALL THE POTENTIAL DANGERS OF USE OR INTERACTION WITH OTHER CHEMICALS OR SUBSTANCES. ABSOLUTE STANDARDS INC. WARRANTS THAT THE CHEMICAL MEETS THE SPECIFICATIONS SET FORTH ON THE LABEL. ABSOLUTE STANDARDS INC DISCLAIMS ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED WITH REGARD TO THE PRODUCT SUPPLIED HEREUNDER, ITS MERCHANTABILITY OR ITS FITNESS FOR A PARTICULAR APPLICATION. THE USER SHOULD RECOGNIZE THAT THIS PRODUCT CAN CAUSE SEVERE INJURY OR DEATH, ESPECIALLY IF IMPROPERLY HANDLED OR THE KNOWN DANGERS OF USE ARE NOT HEEDED. READ ALL PRECAUTIONARY INFORMATION. AS NEW DOCUMENTED GENERAL SAFETY INFORMATION BECOMES AVAILABLE, ABSOLUTE STANDARDS INC. WILL PERIODICALLY REVISE THIS MATERIAL SAFETY DATA SHEET. IF YOU HAVE ANY QUESTIONS, PLEASE CALL TECHNICAL SERVICE AT 1-203-281-2917 FOR ASSISTANCE.

PRINTED: 8/16/04

A&K PETRO-CHEM CANADA
NITRIC ACID Revised: 06/13/2007

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PHYSICAL PROPERTIES
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TOXICOLOGICAL AND HEALTH DATA
PREVENTATIVE MEASURES
TDG: SHIPPING INFORMATION

MSDS

A & K PETROCHEM INDUSTRIES LTD.
316 EDGELEY BLVD.
CONCORD, ONTARIO, L4K 3Y3

TELEPHONE:
TORONTO: (416) 213-5611

CONCORD:
FAX: (905) 660-0773

EMERGENCY NUMBERS:
CANUTEC: (613) 996-6666
POISON CONTROL CENTRE: 598-5900

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

PRODUCT NAME: NITRIC ACID

CHEMICAL NAME: NITRIC ACID

SYNONYMS: HYDROGEN NITRATE

CHEMICAL FAMILY: MINERAL ACIDS

MOLECULAR FORMULA: HNO3

HAZARDOUS INGREDIENTS OF MATERIALS

NAME	%	LD50 (OR LC50)	TLV/TWA (MG/M3)	CAS NO.
NITRIC ACID	60-100	NOT REPORTED	5 (2 PPM)	7697-37-32

PHYSICAL PROPERTIES

APPEARANCE AND ODOR: COLORLESS LIQUID, WITH CHOKING ODOR

BOILING POINT/RANGE: 120 DEG. C (248 DEG. F)

MELTING/FREEZING POINT: -42 DEG. C (-44 DEG. F)

VAPOR PRESSURE: 2.9

SPECIFIC GRAVITY: 1.50

VAPOR DENSITY: 2.5

EVAPORATION RATE: NOT APPLICABLE

SOLUBILITY: COMPLETE (IN ALL PROPORTIONS)

% VOLATILE BY VOLUME: 100

pH: NOT APPLICABLE

FIRST AID PROCEDURES

INHALATION:
REMOVE TO FRESH AIR AND KEEP WARM AND AT REST. IF BREATHING BECOMES DIFFICULT OR HAS STOPPED, ADMINISTER ARTIFICIAL RESPIRATION. OBTAIN MEDICAL ATTENTION IMMEDIATELY. EFFECTS OF INHALATION MAY BE DELAYED.

CONTACT WITH SKIN:
PROMPTLY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. REMOVE CONTAMINATED CLOTHING. WASH CLOTHING THOROUGHLY BEFORE REUSE. GET MEDICAL ATTENTION IF SKIN IRRITATION PERSISTS.

CONTACT WITH EYES:
IMMEDIATELY FLUSH WITH PLENTY OF WATER, LIFTING EYELIDS OCCASIONALLY TO FACILITATE IRRIGATION AND CONTINUE FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION AT ONCE.

INGESTION:
IF CONSCIOUS, GIVE WATER OR MILK TO DILUTE ACID. DO NOT INDUCE VOMITING. OBTAIN MEDICAL ATTENTION IMMEDIATELY.

OTHER MEDICAL CARE: NOT REPORTED

REACTIVITY DATA

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, LIGHT

MATERIALS TO AVOID:
STRONG BASES, COMBUSTIBLE MATERIALS, STRONG REDUCING AGENTS

HAZARDOUS DECOMPOSITION OR COMBUSTION PRODUCTS: OXIDES OF NITROGEN

FIRE AND EXPLOSION DATA

FLASH POINT (METHOD): NOT APPLICABLE

AUTOIGNITION POINT: NOT APPLICABLE

FLAMMABILITY LIMITS IN AIR:
UEL (%): NOT APPLICABLE
LEL (%): NOT APPLICABLE

FIRE EXTINGUISHING MEDIA: USE WATER SPRAY

FIRE FIGHTING PROCEDURES:
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

OTHER FIRE OR EXPLOSION HAZARDS:
STRONG OXIDIZER. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE. NITROGEN OXIDES CAN BE PRODUCED.

TOXICOLOGICAL AND HEALTH DATA

RECOMMENDED EXPOSURE:

LIMIT (ACGIH TLV-TWA):
TLV/TWA: 5 MG/M3 (2 PPM)
STEL: 10 MG/M3 (4 PPM).

TOXICOLOGICAL DATA:
LDLO (HUMAN, ORAL): 430 MG/KG

CARCINOGENICITY DATA: NOT AVAILABLE/REPORTED

REPRODUCTIVE EFFECTS: NOT AVAILABLE/REPORTED

MUTAGENICITY DATA: NOT AVAILABLE/REPORTED

TERATOGENICITY DATA: NOT AVAILABLE/REPORTED

SYNERGISTIC MATERIALS: NOT AVAILABLE/REPORTED

EFFECTS OF EXPOSURE FROM:

INHALATION:
MAY CAUSE SEVERE COUGHING, CHEST PAINS, DIFFICULTY BREATHING, IRRITATION OF THE RESPIRATORY SYSTEM, OR UNCONSCIOUSNESS.

SKIN CONTACT: LIQUID MAY CAUSE SEVERE BURNS

EYE CONTACT: LIQUID MAY CAUSE SEVERE BURNS

INGESTION: MAY BE FATAL

OTHER HEALTH EFFECTS: NOT AVAILABLE

PREVENTATIVE MEASURES

ENGINEERING CONTROLS:
USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION:

RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV.

AT CONCENTRATIONS UP TO 100 PPM, A CHEMICAL CARTRIDGE RESPIRATOR WITH ACID CARTRIDGE IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

SKIN PROTECTION:
FACE SHIELD, UNIFORM, PROTECTIVE SUIT, ACID RESISTANT GLOVES ARE RECOMMENDED

EYE PROTECTION: SAFETY GOGGLES ARE RECOMMENDED

OTHER PERSONAL PROTECTIVE EQUIPMENT: NOT APPLICABLE

HANDLING PROCEDURES AND EQUIPMENT: NOT APPLICABLE

STORAGE REQUIREMENTS:
KEEP CONTAINER TIGHTLY CLOSED. STORE SEPARATELY AND AWAY FROM FLAMMABLE AND COMBUSTIBLE MATERIALS.

OTHER PRECAUTIONS: NOT APPLICABLE

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR LEAK:

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

STOP LEAK IF YOU CAN DO SO WITHOUT RISK. VENTILATE AREA. NEUTRALIZE SPILL WITH SODA ASH OR LIME, WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER. KEEP COMBUSTIBLES (WOOD, PAPER, OIL, ETC.) AWAY FROM SPILLED MATERIAL.

ENVIRONMENTAL EFFECTS: NOT APPLICABLE

DEACTIVATING CHEMICALS: NOT APPLICABLE

WASTE DISPOSAL METHODS:
DISPOSE OF IN ACCORDANCE WITH FEDERAL, PROVINCIAL, STATE, AND LOCAL REGULATIONS ON CHEMICAL WASTE DISPOSAL.

TDG: SHIPPING INFORMATION

SHIPPING NAME: NITRIC ACID, MORE THAN 70%

SHIPPING CLASS: 8

UN: 2031

PACKING GROUP: I

WHMIS CLASS: C, E, D2

DATE ISSUED: OCTOBER 31, 1988

DATE REVISED: JUNE 13, 2007

PREPARED BY: THOMAS KYRON

MSDS INDEX NO.:

THE INFORMATION SET FORTH HEREIN HAS BEEN GATHERED FROM STANDARD REFERENCE MATERIALS AND/OR A & K PETROCHEM INDUSTRIES LTD TEST DATA AND IS TO THE BEST KNOWLEDGE AND BELIEF OF A & K PETROCHEM INDUSTRIES LTD ACCURATE AND RELIABLE. SUCH INFORMATION IS OFFERED SAFETY FOR YOUR CONSIDERATION, INVESTIGATION, AND VERIFICATION, AND IT IS NOT SUGGESTED OR GUARANTEED THAT THE HAZARD PRECAUTIONS OR PROCEDURES MENTIONED ARE THE ONLY ONES WHICH EXIST. A & K PETROCHEM INDUSTRIES LTD MAKES NO WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THE USE OF SUCH INFORMATION OR THE USE OF THE SPECIFIC MATERIAL IDENTIFIED HEREIN IN COMBINATION WITH ANY OTHER MATERIAL OR PROCESS, AND ASSUMES NO RESPONSIBILITY THEREFORE.

ALFA AESAR
POTASSIUM PERMANGANATE, A12170, L09292 Revised: 08/30/2006

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ALFA AESAR(R*)
A JOHNSON MATTHEY COMPANY

MATERIAL SAFETY DATA SHEET

ACC. TO OSHA AND ANSI

PRINTING DATE: 09/07/2007

REVIEWED ON: 08/30/2006

1 IDENTIFICATION OF SUBSTANCE

PRODUCT DETAILS:

PRODUCT NAME: POTASSIUM PERMANGANATE

STOCK NUMBER:
A12170
L09292

MANUFACTURER/SUPPLIER:
ALFA AESAR
A JOHNSON MATTHEY COMPANY
JOHNSON MATTHEY CATALOG COMPANY, INC.
30 BOND STREET
WARD HILL, MA 01835-8099

EMERGENCY PHONE: (978) 521-6300

CHEMTREC: (800) 424-9300

WEB SITE: WWW.ALFA.COM

INFORMATION DEPARTMENT: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT

EMERGENCY INFORMATION:
DURING NORMAL HOURS THE HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.
AFTER NORMAL HOURS CALL CHEMTREC AT (800) 424-9300.

2 COMPOSITION/DATA ON COMPONENTS

CHEMICAL CHARACTERIZATION:

DESCRIPTION	(CAS#)	
POTASSIUM PERMANGANATE	(CAS# 7722-64-7)	100%

IDENTIFICATION NUMBER(S):

EINECS NUMBER: 231-760-3
EU NUMBER: 025-002-00-9

3 HAZARDS IDENTIFICATION

HAZARD DESCRIPTION:
Xn: HARMFUL
O: OXIDIZING
N: DANGEROUS FOR THE ENVIRONMENT

INFORMATION PERTAINING TO PARTICULAR DANGERS FOR MAN AND ENVIRONMENT:

R 8: CONTACT WITH COMBUSTIBLE MATERIAL MAY CAUSE FIRE.

R 22: HARMFUL IF SWALLOWED.

R 50/53:
VERY TOXIC TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

CLASSIFICATION SYSTEM:

HMIS RATINGS (SCALE 0-4) (HAZARDOUS MATERIALS IDENTIFICATION SYSTEM):
HEALTH 2
FIRE 0
REACTIVITY 2

HEALTH (ACUTE EFFECTS) 2
FLAMMABILITY 0
REACTIVITY 2

4 FIRST AID MEASURES

AFTER INHALATION:
SUPPLY FRESH AIR. IF REQUIRED, PROVIDE ARTIFICIAL RESPIRATION.
KEEP PATIENT WARM.
SEEK IMMEDIATE MEDICAL ADVICE.

AFTER SKIN CONTACT:
IMMEDIATELY WASH WITH WATER AND SOAP AND RINSE THOROUGHLY.
SEEK IMMEDIATE MEDICAL ADVICE.

AFTER EYE CONTACT:
RINSE OPENED EYE FOR SEVERAL MINUTES UNDER RUNNING WATER.
THEN CONSULT A DOCTOR.

AFTER SWALLOWING: SEEK IMMEDIATE MEDICAL ADVICE.

5 FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING AGENTS:
USE CARBON DIOXIDE, EXTINGUISHING POWDER OR FOAM. WATER MAY BE INEFFECTIVE BUT MAY BE USED FOR COOLING EXPOSED CONTAINERS.

SPECIAL HAZARDS CAUSED BY THE MATERIAL, ITS PRODUCTS OF COMBUSTION OR RESULTING GASES:

IN CASE OF FIRE, THE FOLLOWING CAN BE RELEASED:
METAL OXIDE FUME
THIS SUBSTANCE IS AN OXIDIZER AND ITS HEAT OF REACTION WITH REDUCING AGENTS OR COMBUSTIBLES MAY CAUSE IGNITION.

PROTECTIVE EQUIPMENT:
WEAR SELF-CONTAINED RESPIRATOR.
WEAR FULLY PROTECTIVE IMPERVIOUS SUIT.

6 ACCIDENTAL RELEASE MEASURES

PERSON-RELATED SAFETY PRECAUTIONS:
WEAR PROTECTIVE EQUIPMENT. KEEP UNPROTECTED PERSONS AWAY.
ENSURE ADEQUATE VENTILATION

MEASURES FOR ENVIRONMENTAL PROTECTION:
DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER GOVERNMENTAL PERMITS.

MEASURES FOR CLEANING/COLLECTING:
DISPOSE CONTAMINATED MATERIAL AS WASTE ACCORDING TO ITEM 13.

ADDITIONAL INFORMATION:
SEE SECTION 7 FOR INFORMATION ON SAFE HANDLING
SEE SECTION 8 FOR INFORMATION ON PERSONAL PROTECTION EQUIPMENT.
SEE SECTION 13 FOR DISPOSAL INFORMATION.

7 HANDLING AND STORAGE

HANDLING:

INFORMATION FOR SAFE HANDLING:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY PLACE IN TIGHTLY CLOSED CONTAINERS.
ENSURE GOOD VENTILATION AT THE WORKPLACE.

INFORMATION ABOUT PROTECTION AGAINST EXPLOSIONS AND FIRES:
SUBSTANCE/PRODUCT CAN REDUCE THE IGNITION TEMPERATURE OF FLAMMABLE SUBSTANCES.

THIS SUBSTANCE IS AN OXIDIZER AND ITS HEAT OF REACTION WITH REDUCING AGENTS OR COMBUSTIBLES MAY CAUSE IGNITION.

STORAGE:

REQUIREMENTS TO BE MET BY STOREROOMS AND RECEPTACLES:
NO SPECIAL REQUIREMENTS.

INFORMATION ABOUT STORAGE IN ONE COMMON STORAGE FACILITY:
STORE AWAY FROM FLAMMABLE SUBSTANCES.
STORE AWAY FROM REDUCING AGENTS.

FURTHER INFORMATION ABOUT STORAGE CONDITIONS:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY CONDITIONS IN WELL SEALED CONTAINERS.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

ADDITIONAL INFORMATION ABOUT DESIGN OF TECHNICAL SYSTEMS:
PROPERLY OPERATING CHEMICAL FUME HOOD DESIGNED FOR HAZARDOUS CHEMICALS AND HAVING AN AVERAGE FACE VELOCITY OF AT LEAST 100 FEET PER MINUTE.

COMPONENTS WITH LIMIT VALUES THAT REQUIRE MONITORING AT THE WORKPLACE:

MANGANESE, ELEMENTAL & INORGANIC COMPOUNDS (AS Mn):

	MG/M3
ACGIH TLV	0.2
AUSTRIA MAK	5
BELGIUM TWA	5
DENMARK TWA	2.5
FINLAND TWA	0.5
HUNGARY TWA	0.3; 0.6-STEL
GERMANY MAK	0.55
JAPAN OEL	0.3 (RESPIRABLE DUST)
KOREA TLV	0.2

NETHERLANDS MAC-TGG	1; 3-MAC-K
NORWAY TWA	2.5
POLAND TWA	0.3; 5-MAC
RUSSIA	0.2-STEL (FUME)
SWEDEN NGV	1; 2.5-TGV (RESPIRABLE DUST) 2.5; 5-TGV (TOTAL DUST)
UNITED KINGDOM TWA	5
USA PEL	5-CEILING

ADDITIONAL INFORMATION: NO DATA

PERSONAL PROTECTIVE EQUIPMENT:

GENERAL PROTECTIVE AND HYGIENIC MEASURES:
THE USUAL PRECAUTIONARY MEASURES FOR HANDLING CHEMICALS SHOULD BE FOLLOWED.
KEEP AWAY FROM FOODSTUFFS, BEVERAGES AND FEED.
REMOVE ALL SOILED AND CONTAMINATED CLOTHING IMMEDIATELY.
WASH HANDS BEFORE BREAKS AND AT THE END OF WORK.

BREATHING EQUIPMENT:
USE SUITABLE RESPIRATOR WHEN HIGH CONCENTRATIONS ARE PRESENT.

PROTECTION OF HANDS:
IMPERVIOUS GLOVES
CHECK PROTECTIVE GLOVES PRIOR TO EACH USE FOR THEIR PROPER CONDITION.

MATERIAL OF GLOVES:
THE SELECTION OF SUITABLE GLOVES NOT ONLY DEPENDS ON THE MATERIAL,
BUT ALSO ON QUALITY. QUALITY WILL VARY FROM MANUFACTURER TO MANUFACTURER.

EYE PROTECTION: SAFETY GLASSES

BODY PROTECTION: PROTECTIVE WORK CLOTHING.

9 PHYSICAL AND CHEMICAL PROPERTIES

GENERAL INFORMATION:
FORM: CRYSTALLINE
COLOR: VIOLET
ODOR: ODORLESS

CHANGE IN CONDITION:
MELTING POINT/MELTING RANGE: NOT DETERMINED
BOILING POINT/BOILING RANGE: NOT DETERMINED

SUBLIMATION TEMPERATURE / START: NOT DETERMINED

FLASH POINT: NOT APPLICABLE

FLAMMABILITY (SOLID, GASEOUS):
CONTACT WITH COMBUSTIBLE MATERIAL MAY CAUSE FIRE.

IGNITION TEMPERATURE: NOT DETERMINED

DECOMPOSITION TEMPERATURE: NOT DETERMINED

EXPLOSION LIMITS:
LOWER: NOT DETERMINED
UPPER: NOT DETERMINED

VAPOR PRESSURE: NOT DETERMINED

DENSITY AT 20 DEG. C (68 DEG. F): 2.703 G/CM3

SOLUBILITY IN / MISCIBILITY WITH WATER: SOLUBLE

10 STABILITY AND REACTIVITY

THERMAL DECOMPOSITION / CONDITIONS TO BE AVOIDED:
DECOMPOSITION WILL NOT OCCUR IF USED AND STORED ACCORDING TO SPECIFICATIONS.

MATERIALS TO BE AVOIDED: REDUCING AGENTS

DANGEROUS REACTIONS:
REACTS WITH REDUCING AGENTS
REACTS WITH FLAMMABLE SUBSTANCES

DANGEROUS PRODUCTS OF DECOMPOSITION: METAL OXIDE FUME

11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

LD/LC50 VALUES THAT ARE RELEVANT FOR CLASSIFICATION:

ORAL:
LD50:
1151 MG/KG (GPG)
2157 MG/KG (MUS)
750 MG/KG (RAT)

LDLO:
400 MG/KG (DOG)
143 MG/KG (HMN)
600 GM/KG (RBT)
100 MG/KG (WMN)

PRIMARY IRRITANT EFFECT:
ON THE SKIN: IRRITANT TO SKIN AND MUCOUS MEMBRANES.
ON THE EYE: IRRITATING EFFECT.

SENSITIZATION: NO SENSITIZING EFFECTS KNOWN.

OTHER INFORMATION (ABOUT EXPERIMENTAL TOXICOLOGY):
REPRODUCTIVE EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH BACTERIA.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.

SUBACUTE TO CHRONIC TOXICITY:
CHRONIC EXPOSURE TO MANGANESE MAY CAUSE IMPAIRMENT TO THE CENTRAL NERVOUS SYSTEM. SYMPTOMS INCLUDE SLUGGISHNESS, SLEEPINESS, MUSCLE WEAKNESS, LOSS OF FACIAL MUSCLE CONTROL, EDEMA, EMOTIONAL DISTURBANCES, SPASTIC GAIT AND FALLING.

SUBACUTE TO CHRONIC TOXICITY:

THE REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) REPORTS THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:

GASTROINTESTINAL - NAUSEA OR VOMITING.

GASTROINTESTINAL - OTHER CHANGES.

BEHAVIORAL - SOMNOLENCE (GENERAL DEPRESSED ACTIVITY).

BEHAVIORAL - ALTERATION OF CLASSICAL CONDITIONING.

BLOOD - CHANGES IN SERUM COMPOSITION (E.G. TP, BILIRUBIN, CHOLESTEROL).

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - TRUE CHOLINESTERASE.

VASCULAR - BP LOWERING NOT CHARACTERIZED IN AUTONOMIC SECTION.

LIVER - HEPATITIS (HEPATOCELLULAR NECROSIS), DIFFUSE KIDNEY, URETER, BLADDER - CHANGES IN TUBULES (INCLUDING ACUTE RENAL FAILURE, ACUTE TUBULAR NECROSIS).

LUNGS, THORAX, OR RESPIRATION - DYSPNEA.

REPRODUCTIVE - FERTILITY - MALE FERTILITY INDEX (E.G. # MALES IMPREGNATING FEMALES PER # MALES EXPOSED TO FERTILE NONPREGNANT FEMALES)

REPRODUCTIVE - PATERNAL EFFECTS - SPERMATOGENESIS (INCLUDING GENETIC MATERIAL, SPERM MORPHOLOGY, MOTILITY, AND COUNT).

ADDITIONAL TOXICOLOGICAL INFORMATION:
TO THE BEST OF OUR KNOWLEDGE THE ACUTE AND CHRONIC TOXICITY OF THIS SUBSTANCE IS NOT FULLY KNOWN.

EPA-D:
NOT CLASSIFIABLE AS TO HUMAN CARCINOGENICITY:
INADEQUATE HUMAN AND ANIMAL EVIDENCE OF CARCINOGENICITY OR NO DATA ARE AVAILABLE.

12 ECOLOGICAL INFORMATION

ECOTOXICAL EFFECTS:

REMARK: VERY TOXIC FOR FISH

GENERAL NOTES:
DO NOT ALLOW PRODUCT TO REACH GROUND WATER, WATER COURSE OR SEWAGE SYSTEM, EVEN IN SMALL QUANTITIES.

DANGER TO DRINKING WATER IF EVEN EXTREMELY SMALL QUANTITIES LEAK INTO THE GROUND.

ALSO POISONOUS FOR FISH AND PLANKTON IN WATER BODIES.

DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER GOVERNMENTAL PERMITS.

VERY TOXIC FOR AQUATIC ORGANISMS

13 DISPOSAL CONSIDERATIONS

PRODUCT:

RECOMMENDATION:
CONSULT STATE, LOCAL OR NATIONAL REGULATIONS TO ENSURE PROPER DISPOSAL.

UNCLEANED PACKAGINGS:

RECOMMENDATION: DISPOSAL MUST BE MADE ACCORDING TO OFFICIAL REGULATIONS.

RECOMMENDED CLEANSING AGENT: WATER, IF NECESSARY WITH CLEANSING AGENTS.

14 TRANSPORT INFORMATION

DOT REGULATIONS:
HAZARD CLASS: 5.1
IDENTIFICATION NUMBER: UN1490
PACKING GROUP: II
HAZARDOUS SUBSTANCE: 100 LBS, 45.4 KG
PROPER SHIPPING NAME (TECHNICAL NAME): POTASSIUM PERMANGANATE
LABEL: 5.1

LAND TRANSPORT ADR/RID (CROSS-BORDER):
ADR/RID CLASS: 5.1 (O2) OXIDIZING SUBSTANCES
DANGER CODE (KEMLER): 50
UN-NUMBER: 1490
PACKAGING GROUP: II
DESCRIPTION OF GOODS: 1490 POTASSIUM PERMANGANATE

MARITIME TRANSPORT IMDG:
IMDG CLASS: 5.1
UN NUMBER: 1490
LABEL 5.1
PACKAGING GROUP: II
PROPER SHIPPING NAME: POTASSIUM PERMANGANATE

AIR TRANSPORT ICAO-TI AND IATA-DGR:
ICAO/IATA CLASS: 5.1
UN/ID NUMBER: 1490
LABEL: 5.1

PACKAGING GROUP: II
PROPER SHIPPING NAME: POTASSIUM PERMANGANATE

15 REGULATIONS

PRODUCT RELATED HAZARD INFORMATIONS:

HAZARD SYMBOLS:
Xn: HARMFUL
O: OXIDIZING
N: DANGEROUS FOR THE ENVIRONMENT

RISK PHRASES:

8: CONTACT WITH COMBUSTIBLE MATERIAL MAY CAUSE FIRE.

22: HARMFUL IF SWALLOWED.

50/53:
VERY TOXIC TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

SAFETY PHRASES:

60: THIS MATERIAL AND ITS CONTAINER MUST BE DISPOSED OF AS HAZARDOUS WASTE.

61:
AVOID RELEASE TO THE ENVIRONMENT. REFER TO SPECIAL INSTRUCTIONS/SAFETY DATA SHEETS

NATIONAL REGULATIONS:
ALL COMPONENTS OF THIS PRODUCT ARE LISTED IN THE U.S. ENVIRONMENTAL PROTECTION AGENCY TOXIC SUBSTANCES CONTROL ACT CHEMICAL SUBSTANCE INVENTORY.

ALL COMPONENTS OF THIS PRODUCT ARE LISTED ON THE CANADIAN DOMESTIC SUBSTANCES LIST (DSL).

INFORMATION ABOUT LIMITATION OF USE:
FOR USE ONLY BY TECHNICALLY QUALIFIED INDIVIDUALS. THIS PRODUCT CONTAINS MANGANESE AND IS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372.

16 OTHER INFORMATION

EMPLOYERS SHOULD USE THIS INFORMATION ONLY AS A SUPPLEMENT TO OTHER INFORMATION GATHERED BY THEM, AND SHOULD MAKE INDEPENDENT JUDGMENT OF SUITABILITY OF THIS INFORMATION TO ENSURE PROPER USE AND PROTECT THE HEALTH AND SAFETY OF EMPLOYEES. THIS INFORMATION IS FURNISHED WITHOUT WARRANTY, AND ANY USE OF THE PRODUCT NOT IN CONFORMANCE WITH THIS MATERIAL SAFETY DATA SHEET, OR IN COMBINATION WITH ANY OTHER PRODUCT OR PROCESS, IS THE RESPONSIBILITY OF THE USER.

DEPARTMENT ISSUING MSDS: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.

CONTACT: PAUL V. CONNOLLY

USA

005810149

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ANACHEMIA CANADA
SODIUM PERSULFATE Revised: 05/23/2008

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MATERIAL SAFETY DATA SHEET

ANACHEMIA
255 NORMAN.
LACHINE (MONTREAL)
QUE H8R 1A3

EMERGENCY NUMBERS:
(USA) CHEMTREC: 1 (800) 424-9300 (24 HRS)
(CAN) CANUTEC: 1 (613) 996-6666 (24 HRS)
(USA) ANACHEMIA: 1 (518) 297-4444
(CAN) ANACHEMIA: 1 (514) 489-5711

WHMIS:

WHMIS CLASS: C D-2A
C - OXIDIZING MATERIAL
D2 - MATERIALS CAUSING OTHER TOXIC EFFECTS

PROTECTIVE CLOTHING:
FACE SHIELD
CHEMICAL GOGGLES
GLOVES
APRON
LAB COAT

TDG ROAD/RAIL:
TDG CLASS: 5.1
PIN: UN1505
PG: III

CLASS 5.1, OXIDIZING SUBSTANCES

SECTION I. PRODUCT IDENTIFICATION AND USES

PRODUCT NAME: SODIUM PERSULFATE

CHEMICAL FORMULA: Na2S2O8

CI#: NOT AVAILABLE.

CAS#: 7775-27-1

CODE: AC-8455

FORMULA WEIGHT: 238.10

SYNONYMS: SODIUM PEROXYDISULFATE, AC-8455, 84410

SUPPLIER:
ANACHEMIA CANADA.
255 NORMAN.
LACHINE (MONTREAL)
QUE H8R 1A3

SUPERSEDES:

MATERIAL USES: FOR LABORATORY USE ONLY.

SECTION II. INGREDIENTS

NAME	CAS #	%	TLV
1) SODIUM PERSULFATE	7775-27-1	99	EXPOSURE LIMITS: ACGIH TWA: 0.1 MG/M3

TOXICITY VALUES OF THE HAZARDOUS INGREDIENTS:

SODIUM PERSULFATE:
INTRAPERITONEAL (LD50):
ACUTE: 226 MG/KG (MOUSE).

SECTION III. PHYSICAL DATA

PHYSICAL STATE AND APPEARANCE / ODOR: SOLID. (WHITE CRYSTALS. ODORLESS.)

pH (1% SOLN/WATER): 6-8

ODOR THRESHOLD: NOT AVAILABLE.

PERCENT VOLATILE: 0% AT 21 DEG. C

FREEZING POINT: DECOMPOSES.

BOILING POINT: NOT APPLICABLE.

SPECIFIC GRAVITY: 2.6 (WATER = 1)

VAPOR DENSITY: NOT AVAILABLE.

VAPOR PRESSURE: NOT AVAILABLE.

WATER/OIL DIST. COEFF.: NOT AVAILABLE.

EVAPORATION RATE: NOT APPLICABLE.

SOLUBILITY: 43% IN WATER.

SECTION IV. FIRE AND EXPLOSION DATA

FLASH POINT: NOT AVAILABLE.

FLAMMABLE LIMITS: NOT AVAILABLE.

AUTO-IGNITION TEMPERATURE: NOT AVAILABLE.

FIRE DEGRADATION PRODUCTS: OXIDES OF SULFUR, NITROGEN AND SODIUM. OXYGEN.

FIRE EXTINGUISHING PROCEDURES:
USE FLOODING QUANTITIES OF WATER. DO NOT USE CARBON DIOXIDE OR OTHER GAS-FILLED EXTINGUISHERS, THEY WILL HAVE NO EFFECT ON DECOMPOSING PERSULFATE. WEAR ADEQUATE PERSONAL PROTECTION TO PREVENT CONTACT WITH MATERIAL OR ITS COMBUSTION PRODUCTS. SELF CONTAINED BREATHING APPARATUS WITH A FULL FACEPIECE OPERATED IN A PRESSURE DEMAND OR OTHER POSITIVE PRESSURE MODE.

FIRE AND EXPLOSION HAZARDS:
POWERFUL OXIDIZING AGENT; MAY IGNITE OXIDIZABLE MATERIALS. DECOMPOSES WITH LIBERATION OF HEAT AND OXYGEN WHICH MAY INTENSIFY FIRE IN COMBUSTIBLE SURROUNDINGS. DECOMPOSITION IS ACCELERATED BY MOISTURE AND HIGHER TEMPERATURES. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE AND/OR EXPLOSION. CONTAINER EXPLOSION MAY OCCUR UNDER FIRE CONDITIONS OR WHEN HEATED. EMITS TOXIC FUMES UNDER FIRE CONDITIONS.

SECTION V. TOXICOLOGICAL PROPERTIES

ROUTES OF ENTRY: INHALATION AND INGESTION. SKIN CONTACT. EYE CONTACT.

EFFECTS OF ACUTE EXPOSURE:
HARMFUL BY INGESTION, INHALATION, OR SKIN ABSORPTION. IRRITANT. MAY BE SENSITIZER TO ALLERGIC PERSONS.

EYE: CAUSES SEVERE IRRITATION. MAY CAUSE BURNS.

SKIN:
CAUSES SKIN IRRITATION. CONTINUOUS CONTACT MAY PRODUCE SKIN DERMATITIS. MAY CAUSE SENSITIZATION BY SKIN CONTACT.

INHALATION:
MATERIAL IS IRRITATING TO MUCOUS MEMBRANES AND UPPER RESPIRATORY TRACT. EXPOSURE CAN CAUSE COUGHING, CHEST PAINS, DIFFICULTY IN BREATHING. SENSITIVE INDIVIDUALS MAY DEVELOP ECZEMA AND/OR ASTHMA ON INHALATION OF THIS MATERIAL.

INGESTION:
CAUSES GASTROINTESTINAL IRRITATION. NAUSEA, VOMITING, ABDOMINAL PAIN, AND DIARRHEA. LARGE AMOUNTS MAY CAUSE INJURY OR DEATH.

EFFECTS OF CHRONIC OVEREXPOSURE:
ALLERGIC PERSONS MAY DEVELOP DERMATITIS AND ASTHMA. TO THE BEST OF OUR KNOWLEDGE THE CHRONIC TOXICITY OF THIS SUBSTANCE HAS NOT BEEN FULLY INVESTIGATED.

CARCINOGENIC EFFECTS: NOT AVAILABLE.

MUTAGENIC EFFECTS: NOT AVAILABLE.

TERATOGENIC EFFECTS: NOT AVAILABLE.

TOXICITY OF THE PRODUCT TO THE REPRODUCTIVE SYSTEM: NOT AVAILABLE.

MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED:
INDIVIDUALS WITH PREEXISTING DISEASES OF THE SKIN, EYE, OR RESPIRATORY SYSTEM MAY BE MORE SUSCEPTIBLE TO THE TOXICITY OF OVEREXPOSURE TO THIS PRODUCT.

SECTION VI. FIRST AID MEASURES

EYE CONTACT:
IMMEDIATELY FLUSH EYES WITH COPIOUS QUANTITIES OF WATER FOR AT LEAST 15 MINUTES HOLDING LIDS APART TO ENSURE FLUSHING OF THE ENTIRE SURFACE. CALL A PHYSICIAN.

SKIN CONTACT:
IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. IF IRRITATION OCCURS OR PERSISTS SEEK MEDICAL ATTENTION. WASH CONTAMINATED CLOTHING BEFORE REUSING.

INHALATION:
REMOVE PATIENT TO FRESH AIR. ADMINISTER APPROVED OXYGEN SUPPLY IF BREATHING IS DIFFICULT. ADMINISTER ARTIFICIAL RESPIRATION OR CPR IF BREATHING HAS CEASED. CALL A PHYSICIAN.

INGESTION:
IF CONSCIOUS, WASH OUT MOUTH WITH WATER. HAVE CONSCIOUS PERSON DRINK SEVERAL GLASSES OF WATER TO DILUTE. INDUCE VOMITING BY EITHER GIVING IPECAC SYRUP OR BY PLACING FINGER AT BACK OF THROAT. SEEK IMMEDIATE MEDICAL ATTENTION. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS OR CONVULSING PERSON. SEE SECTION 10.

SECTION VII. REACTIVITY DATA

STABILITY: UNSTABLE. DECOMPOSES WITH EXOTHERMIC REACTION.

CONDITIONS TO AVOID:
HIGH TEMPERATURES, SPARKS, OPEN FLAMES AND ALL OTHER SOURCES OF IGNITION, CONTAMINATION.

HAZARDOUS DECOMP. PRODUCTS:
FUMES OF SULFURIC ACID MIST, OXYGEN WHICH SUPPORTS COMBUSTION AND OXIDES OF SULFUR.

INCOMPATIBILITY:
HEAT, MOISTURE, REDUCING AGENTS, HEAVY METALS, ACIDS, ALKALIES, HALIDES (FLUORIDES, CHLORIDES, BROMIDES, IODIDES), COMBUSTIBLE MATERIALS, OXIDIZABLE MATERIALS, ORGANIC MATERIALS, PERCHLORATES, POTASSIUM HYDROXIDE, SULFUR, ALCOHOLS, PHOSPHORUS, HYDRIDES, POWDERED METALS, HYDRAZINE, 2,2'-AZOBIS(2-AMIDINOPROPANE) HYDROCHLORIDE, OXIDIZING AGENTS. REACTS VIOLENTLY WITH MONOMERS (INITIATES POLYMERIZATION).

REACTION PRODUCTS:
REACTS WITH ACIDS, ALKALIS, HALIDES, COMBUSTIBLE AND HEAVY METALS TO RELEASE OXYGEN. METALS, EXCEPT STAINLESS STEEL, MAY CAUSE DECOMPOSITION. HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VIII. PREVENTIVE MEASURES

PROTECTIVE CLOTHING IN CASE OF SPILL AND LEAK:
WEAR SELF-CONTAINED BREATHING APPARATUS, RUBBER BOOTS AND HEAVY RUBBER GLOVES.

SPILL AND LEAK:
EVACUATE. ELIMINATE ALL SOURCES OF IGNITION. MATERIAL SHOULD BE PUT INTO AN APPROVED DOT CONTAINER THEN DILUTED WITH LARGE QUANTITY OF WATER. AVOID RAISING DUST. USE CLEAN PLASTIC OR STAINLESS STEEL SCOOPS ONLY. VENTILATE AREA AND WASH SPILL SITE AFTER MATERIAL PICK UP IS COMPLETE. DO NOT EMPTY INTO DRAINS. DO NOT TOUCH SPILLED MATERIAL. AVOID CONTACT WITH A COMBUSTIBLE MATERIAL (WOOD, PAPER, OIL, CLOTHING...). USE NON-SPARKING TOOLS.

WASTE DISPOSAL:
ACCORDING TO ALL APPLICABLE REGULATIONS. HARMFUL TO AQUATIC LIFE AT LOW CONCENTRATIONS. CAN BE DANGEROUS IF ALLOWED TO ENTER DRINKING WATER INTAKES. DO NOT CONTAMINATE DOMESTIC OR IRRIGATION WATER SUPPLIES, LAKES, STREAMS, PONDS, OR RIVERS.

STORAGE AND HANDLING:
USE CLEAN PLASTIC OR STAINLESS STEEL SCOOPS ONLY. STORE IN A COOL PLACE AWAY FROM HEATED AREAS, SPARKS, AND FLAME. STORE IN A WELL VENTILATED AREA. STORE AWAY FROM INCOMPATIBLE MATERIALS. DO NOT ADD ANY OTHER MATERIAL TO THE CONTAINER. DO NOT WASH DOWN THE DRAIN. DO NOT BREATHE DUST. KEEP AWAY FROM DIRECT SUNLIGHT OR STRONG INCANDESCENT LIGHT. KEEP CONTAINER TIGHTLY CLOSED AND DRY. MANIPULATE UNDER AN ADEQUATE FUME HOOD. AVOID RAISING DUST. PROTECT FROM MOISTURE. MAY REACT IN PRESENCE OF MOISTURE. DO NOT USE PRESSURE TO DISPENSE. AVOID CONTACT WITH A COMBUSTIBLE MATERIAL (WOOD, PAPER, OIL, CLOTHING...). USE NON-SPARKING TOOLS. EMPTY CONTAINERS MAY CONTAIN A HAZARDOUS RESIDUE. HANDLE AND OPEN CONTAINER WITH CARE. MINIMIZE DUST GENERATION AND EXPOSURE - USE DUST MASK OR APPROPRIATE PROTECTION. TAKE OFF IMMEDIATELY ALL CONTAMINATED CLOTHING. THIS PRODUCT MUST BE MANIPULATED BY QUALIFIED PERSONNEL. DO NOT GET IN EYES, ON SKIN, OR ON CLOTHING. WASH WELL AFTER USE. IN ACCORDANCE WITH GOOD STORAGE AND HANDLING PRACTICES. DO NOT ALLOW SMOKING AND FOOD CONSUMPTION WHILE HANDLING. DECOMPOSES IN STORAGE UNDER CONDITIONS OF EXCESSIVE HEAT AND/OR MOISTURE CAUSING RELEASE OF OXIDES OF SULFUR, DENSE MIST OF SULFURIC ACID, AND OXYGEN WHICH SUPPORTS COMBUSTION. CLEAN PLASTIC OR STAINLESS STEEL SCOOPS, SHOVELS, ETC., ARE SUITABLE FOR REMOVAL OF THE PRODUCT FROM THE SHIPPING CONTAINER. METALS OTHER THAN STAINLESS STEEL ARE APT TO CAUSE DECOMPOSITION OF PERSULFATE SOLUTIONS AND CARE SHOULD BE TAKEN SO THAT CONTAMINATES ARE NOT INTRODUCED.

SECTION IX. PROTECTIVE MEASURES

PROTECTIVE CLOTHING:
FACE SHIELD AND SPLASH GOGGLES. IMPERVIOUS NEOPRENE GLOVES, APRON, COVERALLS, AND/OR OTHER RESISTANT PROTECTIVE CLOTHING. SUFFICIENT TO PROTECT SKIN. A OSHA/MSHA JOINTLY APPROVED RESPIRATOR IS ADVISED IN THE ABSENCE OF PROPER ENVIRONMENTAL CONTROLS. IF MORE THAN TLV. DO NOT BREATHE VAPOR. WEAR SELF-CONTAINED BREATHING APPARATUS. DO NOT WEAR CONTACT LENSES. MAKE EYE BATH AND EMERGENCY SHOWER AVAILABLE. ENSURE THAT EYEWASH STATION AND SAFETY SHOWER IS PROXIMAL TO THE WORK-STATION LOCATION.

ENGINEERING CONTROLS:
USE ONLY IN A CHEMICAL FUME HOOD TO KEEP AIRBORNE LEVELS BELOW RECOMMENDED EXPOSURE LIMITS. DO NOT USE IN UNVENTILATED SPACES.

SECTION X. OTHER INFORMATION

SPECIAL PRECAUTIONS OR COMMENTS:

POWERFUL OXIDIZING AGENT; MAY IGNITE OXIDIZABLE MATERIALS.

SENSITIZER!

IRRITANT!

MAY CAUSE BURNS. DO NOT BREATHE DUST. AVOID ALL CONTACT WITH THE PRODUCT. AVOID PROLONGED OR REPEATED EXPOSURE. USE ONLY IN A CHEMICAL FUME HOOD. KEEP AWAY FROM HEAT, SPARKS AND FLAME. USE NON-SPARKING TOOLS. HEAT AND MOISTURE SENSITIVE. CONTACT WITH OTHER MATERIAL MAY CAUSE FIRE AND/OR EXPLOSION. HANDLE AND OPEN CONTAINER WITH CARE. CONTAINER SHOULD BE OPENED ONLY BY A TECHNICALLY QUALIFIED PERSON.

NOTES TO PHYSICIAN:
ASIDE FROM ALLERGIC REACTIONS SUCH AS DERMATITIS AND ASTHMA REPORTED IN ONE CASE ONLY, EXPOSURE PROBLEMS ARE RELATED TO THE OXIDIZING PROPERTIES AND RESEMBLE, AND ARE TREATED LIKE THOSE CAUSED BY STRONG ACIDS. HOWEVER, ATTEMPTS TO NEUTRALIZE WITH BASIC OR HALIDE-CONTAINING MATERIALS SHOULD BE AVOIDED BECAUSE OF POSSIBLE EXOTHERMIC REACTION.

FLOODING OF EXPOSURE AREAS WITH WATER IS SUGGESTED, BUT GASTRIC LAVAGE OR EMESIS INDUCTION FOR INGESTIONS MUST CONSIDER THE POSSIBLE AGGRAVATION OF ESOPHAGEAL INJURY AND THE EXPECTED ABSENCE OF SYSTEM EFFECTS. DEMULCENTS MAY BE HELPFUL. TREATMENT OTHERWISE IS SUPPORTIVE AND SYMPTOMATIC.

RTECS NO: SE0525000 (SODIUM PERSULFATE).

NFPA:

PREPARED BY: MSDS DEPARTMENT

VALIDATED: 23-MAY-2008

EMERGENCY NUMBERS:
(USA) CHEMTREC: 1 (800) 424-9300 (24 HRS)
(CAN) CANUTEC: 1 (613) 996-6666 (24 HRS)
(USA) ANACHEMIA: 1 (518) 297-4444
(CAN) ANACHEMIA: 1 (514) 489-5711

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A&K PETRO-CHEM CANADA
SULFURIC ACID Revised: 01/31/2005

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TDG: SHIPPING INFORMATION

A & K PETROCHEM INDUSTRIES LTD.
316 EDGELEY BLVD.
CONCORD, ONTARIO, L4K 3Y3

TELEPHONE:
TORONTO: (416) 213-5611
CONCORD:

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EMERGENCY NUMBERS:
CANUTEC: (613) 996-6666
POISON CONTROL CENTRE: 598-5900

MATERIAL SAFETY DATA SHEET

PRODUCT IDENTIFICATION

PRODUCT NAME: SULFURIC ACID

CHEMICAL NAME: SULFURIC ACID

SYNONYMS: OIL OF VITRIOL, HYDROGEN SULFATE, SULFURIC ACID

CHEMICAL FAMILY: INORGANIC ACID

MOLECULAR FORMULA: H2SO4

HAZARDOUS INGREDIENTS OF MATERIALS

NAME	%	LD50 (OR LC50)	TLV/TWA (MG/M3)	CAS NO.
SULFURIC ACID (H2SO4)	60-100	ORAL, RAT = 2140 MG/KG;	1.0	7664-93-9

PHYSICAL PROPERTIES

APPEARANCE AND ODOUR: CLEAR WATERLIKE WITH NO ODOUR

VAPOUR DENSITY: 3.4 (AIR=1)

BOILING POINT/RANGE: 327 DEG. C

EVAPORATION RATE: LESS THAN 1 (BUTYL ACETATE=1)

MELTING/FREEZING POINT: -2 DEG. C

VAPOUR PRESSURE: LESS THAN 0.3 (20 DEG. C)

SOLUBILITY: TOTALLY

SPECIFIC GRAVITY: 1.84 (H2O=1)

% VOLATILE BY VOLUME: NOT APPLICABLE

pH: 1.0 (0.05M SOLUTION)

FIRST AID PROCEDURES

INHALATION:
REMOVE TO FRESH AIR. IF NOT BREATHING, PER FORM ARTIFICIAL RESPIRATION. GET MEDICAL ATTENTION.

CONTACT WITH SKIN:
FLUSH IMMEDIATELY WITH WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING. GET IMMEDIATE MEDICAL ATTENTION. WASH CLOTHING BEFORE REUSE. DESTROY CONTAMINATED SHOES.

CONTACT WITH EYES:
FLUSH IMMEDIATELY WITH WATER FOR AT LEAST 15 MINUTES. FORCIBLY HOLD EYELIDS APART TO ENSURE COMPLETE IRRIGATION OF EYELID TISSUE. GET IMMEDIATE MEDICAL ATTENTION.

INGESTION:
DRINK COPIOUS AMOUNTS OF WATER OR MILK. DO NOT INDUCE VOMITING. GET IMMEDIATE MEDICAL ATTENTION.

OTHER MEDICAL CARE:
NOTE TO PHYSICIAN: THE APPLICATION OF ICE TO SKIN BURNS WILL REDUCE SCARRING.

REACTIVITY DATA

STABILITY: STABLE.

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID:
CONCENTRATED ACID IS A STRONG OXIDIZING AGENT. MAY CAUSE IGNITION OF COMBUSTIBLE MATERIAL ON CONTACT WITH GENERATION SULPHUR DIOXIDE FUMES. AVOID OPEN FLAMES OR SPARKS.

MATERIALS TO AVOID:
MATERIAL IS STABLE WHEN PROPERLY HANDLED. HIGHLY REACTIVE WITH MATERIALS SUCH AS METALS, METAL OXIDES, HYDROXIDES, NITRATES, AMINES, CARBONATES AND OTHER ALKALINE MATERIALS. REACTIONS CAN GENERATE A GREAT DEAL OF HEAT AS DOES THE DILUTION OF ACID WITH WATER.

HAZARDOUS DECOMPOSITION OR COMBUSTION PRODUCTS:
EXPLOSIVE HYDROGEN GAS IS GENERATED BY THE ACTION OF ACID ON MOST METALS AND MAY ACCUMULATE IN METAL CONTAINERS.

FIRE AND EXPLOSION DATA

FLASH POINT (METHOD): NOT FLAMMABLE. MAY IGNITE COMBUSTIBLE MATERIALS.

AUTOIGNITION POINT: NOT APPLICABLE

FLAMMABILITY LIMITS IN AIR:
UEL (%): NOT APPLICABLE
LEL (%): NOT APPLICABLE

FIRE EXTINGUISHING MEDIA: DRY CHEMICAL, OR CO2 BASE FIRE EXTINGUISHERS

FIRE FIGHTING PROCEDURES:
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.

OTHER FIRE OR EXPLOSION HAZARDS:
VIOLENT REACTION WITH WATER. EVOLUTION OF EXPLOSIVE HYDROGEN GAS ON CONTACT WITH MOST METALS.

TOXICOLOGICAL AND HEALTH DATA

RECOMMENDED EXPOSURE LIMIT (ACGIH TLV-TWA):
1.0 PPM OR 0.25 PPM EXPRESSED AS MIST OR SPRAY.

TOXICOLOGICAL DATA:
LD50 (ORAL, RAT) = 2140 MG/KG;
LD50 (DERMAL, RABBIT) = 3160 MG/KG;
LC50 (MICE) = 500 MG/KG (8 HRS)

CARCINOGENICITY DATA: NONE REPORTED NOR EXPECTED

REPRODUCTIVE EFFECTS: NONE REPORTED NOR EXPECTED

MUTAGENICITY DATA: NONE REPORTED NOR EXPECTED

TERATOGENICITY DATA: NONE REPORTED NOR EXPECTED

SYNERGISTIC MATERIALS: NONE REPORTED NOR EXPECTED

EFFECTS OF EXPOSURE FROM:

INHALATION:
INHALATION OF CONCENTRATED VAPOUR OR MIST WILL DAMAGE UPPER RESPIRATORY TRACT AND LUNG TISSUES. REPEATED EXPOSURE MAY CAUSE CHRONIC BRONCHITIS OR INFLAMMATION.

SKIN CONTACT:
CONTACT WITH LIQUID, MIST OR VAPOUR CAN CAUSE IMMEDIATE IRRITATION OR CORROSIVE BURNS TO ALL HUMAN TISSUE. SEVERITY OF THE BURN IS GENERALLY DETERMINED BY THE CONCENTRATION OF THE SOLUTION AND DURATION OF EXPOSURE. REPEATED SKIN CONTACT WITH DILUTE SOLUTIONS MAY CAUSE DERMATITIS.

EYE CONTACT:
CONTACT WITH EYES MAY RESULT IN PERMANENT VISUAL LOSS UNLESS REMOVED QUICKLY BY THOROUGH IRRIGATION WITH WATER.

INGESTION:
NAUSEA, VOMITING, SEVERE BURNS TO MOUTH, THROAT AND STOMACH, KIDNEY DYSFUNCTION, LUNG DAMAGE.

OTHER HEALTH EFFECTS: NOT AVAILABLE/REPORTED

PREVENTATIVE MEASURES

ENGINEERING CONTROLS:
LOCAL EXHAUST: REQUIRED
MECHANICAL (GENERAL): NOT COMPULSORY

RESPIRATORY PROTECTION:
NONE, WHERE ADEQUATE VENTILATION EXISTS, IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF CONTAINED BREATHING APPARATUS IS ADVISED

SKIN PROTECTION: PVC OR NEOPRENE

EYE PROTECTION: GOGGLES AND FACE SHIELD

OTHER PERSONAL PROTECTIVE EQUIPMENT:
SAFETY SHOWERS AND EYE WASH FOUNTAINS SHOULD BE INSTALLED IN STORAGE AND HANDLING AREAS.

HANDLING PROCEDURES AND EQUIPMENT:
WHEN DILUTING, SLOWLY ADD ACID TO WATER WHILE STIRRING TO AVOID SPLATTERING OR BOILING. WATER CANNOT BE ADDED SAFELY TO CONCENTRATED ACID. DO NOT STRIKE CONTAINERS AT FITTINGS WITH TOOLS OR HARD OBJECTS. WASH THOROUGHLY AFTER HANDLING. EMPTIED CONTAINER RETAINS VAPOUR AND PRODUCT RESIDUE.

STORAGE REQUIREMENTS:
PROTECT CONTAINER FROM PHYSICAL DAMAGE. KEEP CONTAINER CLOSED AND PROTECT FROM CONTACT WITH WATER TO AVOID POSSIBLE VIOLENT REACTION. STORE AWAY FROM SOURCES OF IGNITION.

OTHER PRECAUTIONS: NOT APPLICABLE

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR LEAK:
UTILIZE FULL PROTECTIVE CLOTHING, INCLUDING BOOTS AND PROTECTIVE EQUIPMENT. CONTAIN SPILL IN ORDER TO PREVENT CONTAMINATION OF SEWAGE SYSTEM OR WATERWAY.

PUMP INTO MARKED CONTAINERS FOR RECLAMATION OR DISPOSAL. IF POSSIBLE, NEUTRALIZE ON A DRY BASIS WITH SUITABLE ALKALI SUCH AS LIME, SODA ASH OR SODIUM BICARBONATE; THEN FLUSH WITH WATER IN ACCORDANCE WITH APPLICABLE REGULATIONS.

ENVIRONMENTAL EFFECTS: NOT AVAILABLE/REPORTED

DEACTIVATING CHEMICALS: NOT APPLICABLE

WASTE DISPOSAL METHODS:
DISPOSE OF SPILLED, NEUTRALIZED, OR WASTE PRODUCT, CONTAMINATED SOIL AND OTHER CONTAMINATED MATERIALS IN LICENSED LANDFILL OR TREATMENT FACILITY IN ACCORDANCE WITH FEDERAL, PROVINCIAL, STATE, AND LOCAL REGULATIONS ON CHEMICAL WASTE DISPOSAL.

TDG: SHIPPING INFORMATION

SHIPPING NAME: SULFURIC ACID, MORE THAN 51 PERCENT ACID

SHIPPING CLASS: 8 (9.2)

UN: 1830

PACKING GROUP: II

WHMIS CLASS: E, D1

DATE ISSUED: OCTOBER 31, 1988

DATE REVISED: JANUARY 31, 2005

PREPARED BY: THOMAS KYRON

MSDS INDEX NO.:

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ALFA AESAR
TRICHLOROETHYLENE, 43487 Revised: 09/26/2003

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ALFA AESAR(R*)
A JOHNSON MATTHEY COMPANY

MATERIAL SAFETY DATA SHEET

ACC. TO OSHA AND ANSI

PRINTING DATE: 09/29/2003

REVIEWED ON: 09/26/2003

1 IDENTIFICATION OF SUBSTANCE

PRODUCT DETAILS:

PRODUCT NAME: TRICHLOROETHYLENE

STOCK NUMBER: 43487

MANUFACTURER/SUPPLIER:
ALFA AESAR, A JOHNSON MATTHEY COMPANY
JOHNSON MATTHEY CATALOG COMPANY, INC.
30 BOND STREET
WARD HILL, MA 01835-8099

EMERGENCY PHONE: (978) 521-6300

CHEMTREC: (800) 424-9300

WEB SITE: WWW.ALFA.COM

INFORMATION DEPARTMENT: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT

EMERGENCY INFORMATION:
DURING NORMAL HOURS THE HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.
AFTER NORMAL HOURS CALL CHEMTREC AT (800) 424-9300.

2 COMPOSITION/DATA ON COMPONENTS

CHEMICAL CHARACTERIZATION:

DESCRIPTION	(CAS#)	
TRICHLOROETHYLENE	(CAS# 79-01-6)	100%

IDENTIFICATION NUMBER(S):

EINECS NUMBER: 201-167-4

EU NUMBER: 602-027-00-9

3 HAZARDS IDENTIFICATION

HAZARD DESCRIPTION:
T: TOXIC

INFORMATION PERTAINING TO PARTICULAR DANGERS FOR MAN AND ENVIRONMENT:
CAUSES A NARCOTIC EFFECT.

R 45: MAY CAUSE CANCER.

R 36/38: IRRITATING TO EYES AND SKIN.

R 52/53:
HARMFUL TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

R 67: VAPORS MAY CAUSE DROWSINESS AND DIZZINESS

CLASSIFICATION SYSTEM:

HMIS RATINGS (SCALE 0-4):
(HAZARDOUS MATERIALS IDENTIFICATION SYSTEM):
HEALTH (ACUTE EFFECTS) 2
FLAMMABILITY 0
REACTIVITY 0

4 FIRST AID MEASURES

AFTER INHALATION:
SUPPLY FRESH AIR. IF REQUIRED, PROVIDE ARTIFICIAL RESPIRATION. KEEP PATIENT WARM. SEEK IMMEDIATE MEDICAL ADVICE.

AFTER SKIN CONTACT:
IMMEDIATELY WASH WITH WATER AND SOAP AND RINSE THOROUGHLY.
SEEK IMMEDIATE MEDICAL ADVICE.

AFTER EYE CONTACT:
RINSE OPENED EYE FOR SEVERAL MINUTES UNDER RUNNING WATER. THEN CONSULT A DOCTOR.

AFTER SWALLOWING: SEEK IMMEDIATE MEDICAL ADVICE.

5 FIRE FIGHTING MEASURES

SUITABLE EXTINGUISHING AGENTS:
PRODUCT IS NOT FLAMMABLE. USE FIRE FIGHTING MEASURES THAT SUIT THE SURROUNDING FIRE.

SPECIAL HAZARDS CAUSED BY THE MATERIAL, ITS PRODUCTS OF COMBUSTION OR RESULTING GASES:
IN CASE OF FIRE, THE FOLLOWING CAN BE RELEASED:
CARBON MONOXIDE AND CARBON DIOXIDE
HYDROGEN CHLORIDE (HCl)

PROTECTIVE EQUIPMENT:
WEAR SELF-CONTAINED RESPIRATOR.
WEAR FULLY PROTECTIVE IMPERVIOUS SUIT.

6 ACCIDENTAL RELEASE MEASURES

PERSON-RELATED SAFETY PRECAUTIONS:
WEAR PROTECTIVE EQUIPMENT. KEEP UNPROTECTED PERSONS AWAY.
ENSURE ADEQUATE VENTILATION

MEASURES FOR ENVIRONMENTAL PROTECTION:
DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER

GOVERNMENTAL PERMITS.

MEASURES FOR CLEANING/COLLECTING:
ABSORB WITH LIQUID-BINDING MATERIAL (SAND, DIATOMITE, ACID BINDERS, UNIVERSAL BINDERS, SAWDUST).
DISPOSE CONTAMINATED MATERIAL AS WASTE ACCORDING TO ITEM 13.

ADDITIONAL INFORMATION:
SEE SECTION 7 FOR INFORMATION ON SAFE HANDLING
SEE SECTION 8 FOR INFORMATION ON PERSONAL PROTECTION EQUIPMENT.
SEE SECTION 13 FOR DISPOSAL INFORMATION.

7 HANDLING AND STORAGE

HANDLING:

INFORMATION FOR SAFE HANDLING:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY PLACE IN TIGHTLY CLOSED CONTAINERS.
ENSURE GOOD VENTILATION AT THE WORKPLACE.
OPEN AND HANDLE CONTAINER WITH CARE.

INFORMATION ABOUT PROTECTION AGAINST EXPLOSIONS AND FIRES:
THE PRODUCT IS NOT FLAMMABLE

STORAGE:

REQUIREMENTS TO BE MET BY STOREROOMS AND RECEPTACLES:
NO SPECIAL REQUIREMENTS.

INFORMATION ABOUT STORAGE IN ONE COMMON STORAGE FACILITY:
STORE IN THE DARK.
STORE AWAY FROM OXIDIZING AGENTS.

FURTHER INFORMATION ABOUT STORAGE CONDITIONS:
KEEP CONTAINER TIGHTLY SEALED.
STORE IN COOL, DRY CONDITIONS IN WELL SEALED CONTAINERS.
PROTECT FROM EXPOSURE TO LIGHT.
STORE UNDER LOCK AND KEY AND WITH ACCESS RESTRICTED TO TECHNICAL EXPERTS OR THEIR ASSISTANTS ONLY.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

ADDITIONAL INFORMATION ABOUT DESIGN OF TECHNICAL SYSTEMS:
PROPERLY OPERATING CHEMICAL FUME HOOD DESIGNED FOR HAZARDOUS CHEMICALS AND HAVING AN AVERAGE FACE VELOCITY OF AT LEAST 100 FEET PER MINUTE.

COMPONENTS WITH LIMIT VALUES THAT REQUIRE MONITORING AT THE WORKPLACE:

TRICHLOROETHYLENE:

	PPM
ACGIH TLV	50; 100-STEL NOT CLASSIFIED AS A HUMAN CARCINOGEN
AUSTRIA MAK	50; SUSPECTED CARCINOGEN
BELGIUM TWA	50; 200-STEL
DENMARK TWA	10
FINLAND TWA	30; 45-STEL (SKIN)
FRANCE VME	75; 200-VLE; C3 CARCINOGEN
GERMANY MAK	50; CARCINOGEN
HUNGARY TWA	10 MG/M3; 40 MG/M3-STEL
JAPAN OEL	50; 2B CARCINOGEN
KOREA TLV	50; 100-STEL

NETHERLANDS MAC-TGG	35; 100-MAC-K
POLAND TWA	50 MG/M3; 400 MG/M3-STEL
RUSSIA TWA	50; 10 MG/M3-STEL
SWEDEN NGV	10; 25-KTV; CARCINOGEN
SWITZERLAND MAK-W	50; 250-KZG-W
UNITED KINGDOM TWA	100; 150-STEL (SKIN)
USA PEL	100; 200-CEILING; 300 (5 MINUTE PEAK/2 HOURS)

ADDITIONAL INFORMATION: NO DATA

PERSONAL PROTECTIVE EQUIPMENT:

GENERAL PROTECTIVE AND HYGIENIC MEASURES:
THE USUAL PRECAUTIONARY MEASURES FOR HANDLING CHEMICALS SHOULD BE FOLLOWED.
KEEP AWAY FROM FOODSTUFFS, BEVERAGES AND FEED.
REMOVE ALL SOILED AND CONTAMINATED CLOTHING IMMEDIATELY.
WASH HANDS BEFORE BREAKS AND AT THE END OF WORK.
STORE PROTECTIVE CLOTHING SEPARATELY.
AVOID CONTACT WITH THE EYES AND SKIN.

BREATHING EQUIPMENT:
USE SUITABLE RESPIRATOR WHEN HIGH CONCENTRATIONS ARE PRESENT.

PROTECTION OF HANDS:
IMPERVIOUS GLOVES
CHECK PROTECTIVE GLOVES PRIOR TO EACH USE FOR THEIR PROPER CONDITION.

MATERIAL OF GLOVES:
THE SELECTION OF SUITABLE GLOVES NOT ONLY DEPENDS ON THE MATERIAL, BUT ALSO ON QUALITY. QUALITY WILL VERY FROM MANUFACTURER TO MANUFACTURER.

EYE PROTECTION: SAFETY GLASSES

BODY PROTECTION: PROTECTIVE WORK CLOTHING.

9 PHYSICAL AND CHEMICAL PROPERTIES

GENERAL INFORMATION:

FORM: LIQUID

COLOR: COLORLESS

ODOR: CHARACTERISTIC

	VALUE/RANGE	UNIT	METHOD
CHANGE IN CONDITION:			
MELTING POINT/MELTING RANGE	-85	DEG. C	
BOILING POINT/BOILING RANGE	87	DEG. C	
SUBLIMATION TEMPERATURE / START	NOT DETERMINED		
FLASH POINT	NOT DETERMINED		
IGNITION TEMPERATURE	NOT DETERMINED		
DECOMPOSITION TEMPERATURE	NOT DETERMINED		
DANGER OF EXPLOSION	PRODUCT DOES NOT PRESENT AN EXPLOSION HAZARD.		
EXPLOSION LIMITS:			
LOWER	NOT DETERMINED		
UPPER	NOT DETERMINED		
VAPOR PRESSURE	NOT DETERMINED		

DENSITY AT 20 DEG. C	1.46	G/CM3
SOLUBILITY IN / MISCIBILITY WITH WATER	NOT MISCIBLE OR DIFFICULT TO MIX	

10 STABILITY AND REACTIVITY

THERMAL DECOMPOSITION / CONDITIONS TO BE AVOIDED:
DECOMPOSITION WILL NOT OCCUR IF USED AND STORED ACCORDING TO SPECIFICATIONS.

MATERIALS TO BE AVOIDED:
LIGHT
OXIDIZING AGENTS

DANGEROUS REACTIONS: NO DANGEROUS REACTIONS KNOWN

DANGEROUS PRODUCTS OF DECOMPOSITION:
CARBON MONOXIDE AND CARBON DIOXIDE
HYDROGEN CHLORIDE (HCl)

11 TOXICOLOGICAL INFORMATION

ACUTE TOXICITY:

LD/LC50 VALUES THAT ARE RELEVANT FOR CLASSIFICATION:

ORAL:
LD50: 2402 MG/KG (MUS)
LD50: 4920 MG/KG (RAT)
LDLO: 5864 MG/KG (CAT)
LDLO: 7 GM/KG (HMN)
LDLO: 7330 MG/KG (RBT)

DERMAL:
LD50: >20 GM/KG (RBT)

INHALATIVE:
LC50/4H: 8450 PPM/4H (MUS)
LCLO: 2900 PPM (MAN)
LCLO: 11000 PPM (RBT)
LCLO/2H: 32500 MG/M3/2H (CAT)
LCLO/4H: 4800 PPM/4H (RAT)

IRRITATION OF SKIN:
SEVERE: 2 MG/24H (RBT)

IRRITATION OF EYES:
MILD: 20 MG/24H (RBT)

PRIMARY IRRITANT EFFECT:
ON THE SKIN: IRRITANT TO SKIN AND MUCOUS MEMBRANES.
ON THE EYE: IRRITATING EFFECT.

SENSITIZATION: NO SENSITIZING EFFECTS KNOWN.

OTHER INFORMATION (ABOUT EXPERIMENTAL TOXICOLOGY):
TUMORIGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
REPRODUCTIVE EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH BACTERIA.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH LABORATORY ANIMALS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED WITH HUMANS.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH HUMAN LYMPHOCYTES.
MUTAGENIC EFFECTS HAVE BEEN OBSERVED ON TESTS WITH MAMMALS.

SUBACUTE TO CHRONIC TOXICITY:

SUBACUTE TO CHRONIC TOXICITY:
THE REGISTRY OF TOXIC EFFECTS OF CHEMICAL SUBSTANCES (RTECS) REPORTS THE FOLLOWING EFFECTS IN LABORATORY ANIMALS:
BEHAVIORAL - SOMNOLENCE (GENERAL DEPRESSED ACTIVITY).
BEHAVIORAL - TREMOR.
BEHAVIORAL - COMA.
BEHAVIORAL - HALLUCINATIONS, DISTORTED PERCEPTIONS.
BEHAVIORAL - ALTERED SLEEP TIME (INCLUDING CHANGE IN RIGHTING REFLEX).

BEHAVIORAL - ATAXIA.
BEHAVIORAL - SLEEP.
BEHAVIORAL - GENERAL ANESTHETIC.
BEHAVIORAL - CHANGES IN MOTOR ACTIVITY (SPECIFIC ASSAY).
BEHAVIORAL - ALTERATION OF OPERANT CONDITIONING.
BEHAVIORAL - CHANGES IN PSYCHOPHYSIOLOGICAL TESTS.
BEHAVIORAL - TOLERANCE.

LUNGS, THORAX, OR RESPIRATION - RESPIRATORY DEPRESSION.
LUNGS, THORAX, OR RESPIRATION - TUMORS.

SKIN AND APPENDAGES - HAIR.
SKIN AND APPENDAGES - TUMORS.

LIVER - JAUNDICE, OTHER OR UNCLASSIFIED.
LIVER - LIVER FUNCTION TESTS IMPAIRED.
LIVER - CHANGES IN LIVER WEIGHT.
LIVER - OTHER CHANGES.
LIVER - HEPATITIS (HEPATOCELLULAR NECROSIS), ZONAL
LIVER - TUMORS.

VASCULAR - TUMORS.

SENSE ORGANS AND SPECIAL SENSES (EYE) - EFFECT, NOT OTHERWISE SPECIFIED.
SENSE ORGANS AND SPECIAL SENSES (EAR) - CHANGE IN ACUITY.

GASTROINTESTINAL - OTHER CHANGES.

KIDNEY, URETER, BLADDER - CHANGES IN BOTH TUBULES AND GLOMERULI.
KIDNEY, URETER, BLADDER - PROTEINURIA.
KIDNEY, URETER, BLADDER - CHANGES IN BLADDER WEIGHT.
KIDNEY, URETER, BLADDER - OTHER CHANGES IN URINE COMPOSITION.

NUTRITIONAL AND GROSS METABOLIC - WEIGHT LOSS OR DECREASED WEIGHT GAIN.
RELATED TO CHRONIC DATA - DEATH.

PERIPHERAL NERVE AND SENSATION - SPASTIC PARALYSIS WITH OR WITHOUT SENSORY CHANGE.

BLOOD - CHANGES IN SERUM COMPOSITION (E.G. TP, BILIRUBIN, CHOLESTEROL).
BLOOD - PIGMENTED OR NUCLEATED RED BLOOD CELLS.
BLOOD - CHANGES IN LEUKOCYTE (WBC) COUNT.
BLOOD - CHANGES IN BONE MARROW (NOT OTHERWISE SPECIFIED).
BLOOD - LYMPHOMA, INCLUDING HODGKIN'S DISEASE.
BLOOD - TUMORS.

IMMUNOLOGICAL INCLUDING ALLERGIC - DECREASED IMMUNE RESPONSE.
IMMUNOLOGICAL INCLUDING ALLERGIC - DECREASE IN HUMORAL IMMUNE RESPONSE.

BRAIN AND COVERINGS - RECORDINGS FROM SPECIFIC AREAS OF CNS.
BRAIN AND COVERINGS - DEMEYLINATION.
BRAIN AND COVERINGS - OTHER DEGENERATIVE CHANGES.

ENDOCRINE - CHANGES IN SPLEEN WEIGHT.
ENDOCRINE - OTHER CHANGES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - OTHER TRANSFERASES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - DEHYDROGENASES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - TRANSAMINASES.

BIOCHEMICAL - METABOLISM (INTERMEDIARY) - OTHER PROTEINS.
BIOCHEMICAL - METABOLISM (INTERMEDIARY) - LIPIDS INCLUDING TRANSPORT.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - HEPATIC MICROSOMAL MIXED OXIDASE.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - OTHER ESTERASES.

BIOCHEMICAL - ENZYME INHIBITION, INDUCTION, OR CHANGE IN BLOOD OR TISSUE LEVELS - PHOSPHATASES.

REPRODUCTIVE - EFFECTS ON NEWBORN - BEHAVIORAL.
REPRODUCTIVE - EFFECTS ON NEWBORN - WEANING OR LACTATION INDEX (E.G., # ALIVE AT WEANING PER # ALIVE AT DAY 4).

REPRODUCTIVE - SPECIFIC DEVELOPMENTAL ABNORMALITIES - CENTRAL NERVOUS SYSTEM.
REPRODUCTIVE - SPECIFIC DEVELOPMENTAL ABNORMALITIES - MUSCULOSKELETAL SYSTEM.

REPRODUCTIVE - SPECIFIC DEVELOPMENTAL ABNORMALITIES - OTHER DEVELOPMENTAL ABNORMALITIES.

REPRODUCTIVE - PATERNAL EFFECTS - SPERMATOGENESIS (INCLUDING GENETIC MATERIAL, SPERM MORPHOLOGY, MOTILITY, AND COUNT).

TUMORIGENIC - CARCINOGENIC BY RTECS CRITERIA.
TUMORIGENIC - EQUIVOCAL TUMORIGENIC AGENT BY RTECS CRITERIA.

SUBACUTE TO CHRONIC TOXICITY:
TRICHLOROETHYLENE CAUSES DEPRESSION OF THE CENTRAL NERVOUS SYSTEM, DERMATITIS, AND DAMAGE TO THE LIVER, KIDNEYS, CENTRAL NERVOUS SYSTEM AND POSSIBLY OTHER ORGANS.
MAY CROSS THE PLACENTAL BARRIER IN HUMANS.

ADDITIONAL TOXICOLOGICAL INFORMATION:
TO THE BEST OF OUR KNOWLEDGE THE ACUTE AND CHRONIC TOXICITY OF THIS SUBSTANCE IS NOT FULLY KNOWN.

IARC-2A:
PROBABLY CARCINOGENIC TO HUMANS:
LIMITED HUMAN EVIDENCE; SUFFICIENT EVIDENCE IN EXPERIMENTAL ANIMALS

NTP-2:
REASONABLY ANTICIPATED TO BE A CARCINOGEN:
LIMITED EVIDENCE FROM STUDIES IN HUMANS OR SUFFICIENT EVIDENCE FROM STUDIES IN EXPERIMENTAL ANIMALS.

ACGIH A5:
NOT SUSPECTED AS A HUMAN CARCINOGEN:
NOT SUSPECTED AS A HUMAN CARCINOGEN ON THE BASIS OF PROPERLY CONDUCTED EPIDEMIOLOGIC STUDIES IN HUMANS. STUDIES HAVE SUFFICIENTLY LONG FOLLOW-UP, RELIABLE EXPOSURE HISTORIES, SUFFICIENTLY HIGH DOSE, AND ADEQUATE STATISTICAL POWER TO CONCLUDE THAT EXPOSURE TO THE AGENT DOES NOT CONVEY A SIGNIFICANT RISK OF CANCER TO HUMANS. EVIDENCE SUGGESTING A LACK OF CARCINOGENICITY IN EXPERIMENTAL ANIMALS WILL BE CONSIDERED IF IT IS SUPPORTED BY OTHER RELEVANT DATA.

12 ECOLOGICAL INFORMATION

ECOTOXICAL EFFECTS:

REMARK: HARMFUL TO FISH

GENERAL NOTES:
DO NOT ALLOW MATERIAL TO BE RELEASED TO THE ENVIRONMENT WITHOUT PROPER GOVERNMENTAL PERMITS.
HARMFUL TO AQUATIC ORGANISMS

13 DISPOSAL CONSIDERATIONS

PRODUCT:

RECOMMENDATION:
CONSULT STATE, LOCAL OR NATIONAL REGULATIONS TO ENSURE PROPER DISPOSAL.

UNCLEANED PACKAGINGS:
RECOMMENDATION: DISPOSAL MUST BE MADE ACCORDING TO OFFICIAL REGULATIONS.

14 TRANSPORT INFORMATION

DOT REGULATIONS:
HAZARD CLASS: 6.1
IDENTIFICATION NUMBER: UN1710
PACKING GROUP: III
HAZARDOUS SUBSTANCE: 100 LBS, 45.4 KG
PROPER SHIPPING NAME (TECHNICAL NAME): TRICHLOROETHYLENE

LAND TRANSPORT ADR/RID (CROSS-BORDER):
ADR/RID CLASS: 6.1 TOXIC SUBSTANCES
ITEM: 15C
DANGER CODE (KEMLER): 60
UN-NUMBER: 1710
DESCRIPTION OF GOODS: TRICHLOROETHYLENE

MARITIME TRANSPORT IMDG:
IMDG CLASS: 6.1
UN NUMBER: 1710
PACKAGING GROUP: III
PROPER SHIPPING NAME: TRICHLOROETHYLENE

AIR TRANSPORT ICAO-TI AND IATA-DGR:
ICAO/IATA CLASS: 6.1
UN/ID NUMBER: 1710
PACKAGING GROUP: III
PROPER SHIPPING NAME: TRICHLOROETHYLENE

15 REGULATIONS

PRODUCT RELATED HAZARD INFORMATION:

HAZARD SYMBOLS:
T: TOXIC

RISK PHRASES:

45: MAY CAUSE CANCER.

36/38: IRRITATING TO EYES AND SKIN.

52/53:
HARMFUL TO AQUATIC ORGANISMS, MAY CAUSE LONG-TERM ADVERSE EFFECTS IN THE AQUATIC ENVIRONMENT

67: VAPORS MAY CAUSE DROWSINESS AND DIZZINESS

SAFETY PHRASES:

53: AVOID EXPOSURE - OBTAIN SPECIAL INSTRUCTIONS BEFORE USE.

45:
IN CASE OF ACCIDENT OR IF YOU FEEL UNWELL, SEEK MEDICAL ADVICE IMMEDIATELY.

61:
AVOID RELEASE TO THE ENVIRONMENT. REFER TO SPECIAL INSTRUCTIONS/SAFETY DATA SHEETS

NATIONAL REGULATIONS:
ALL COMPONENTS OF THIS PRODUCT ARE LISTED IN THE U.S. ENVIRONMENTAL PROTECTION AGENCY TOXIC SUBSTANCES CONTROL ACT CHEMICAL SUBSTANCE INVENTORY.
THIS PRODUCT CONTAINS A CHEMICAL KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER OR REPRODUCTIVE TOXICITY.

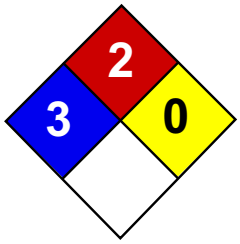
INFORMATION ABOUT LIMITATION OF USE:
FOR USE ONLY BY TECHNICALLY QUALIFIED INDIVIDUALS.
THIS PRODUCT IS SUBJECT TO THE REPORTING REQUIREMENTS OF SECTION 313 OF THE EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT OF 1986 AND 40 CFR 372.

16 OTHER INFORMATION

EMPLOYERS SHOULD USE THIS INFORMATION ONLY AS A SUPPLEMENT TO OTHER INFORMATION GATHERED BY THEM, AND SHOULD MAKE INDEPENDENT JUDGMENT OF SUITABILITY OF THIS INFORMATION TO ENSURE PROPER USE AND PROTECT THE HEALTH AND SAFETY OF EMPLOYEES.
THIS INFORMATION IS FURNISHED WITHOUT WARRANTY, AND ANY USE OF THE PRODUCT NOT IN CONFORMANCE WITH THIS MATERIAL SAFETY DATA SHEET, OR IN COMBINATION WITH ANY OTHER PRODUCT OR PROCESS, IS THE RESPONSIBILITY OF THE USER.

DEPARTMENT ISSUING MSDS: HEALTH, SAFETY AND ENVIRONMENTAL DEPARTMENT.

CONTACT: DARRELL R. SANDERS



Material Safety Data Sheet
Acetic acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Acetic acid

Catalog Codes: SLA3784, SLA1438, SLA2101, SLA3604, SLA1258

CAS#: 64-19-7

RTECS: AF1225000

TSCA: TSCA 8(b) inventory: Acetic acid

CI#: Not applicable.

Synonym: Acetic acid; glacial acetic acid

Chemical Name: Acetic Acid, Glacial

Chemical Formula: C2-H4-O2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Acetic acid	64-19-7	100

Toxicological Data on Ingredients: Acetic acid: ORAL (LD50): Acute: 3310 mg/kg [Rat]. 4960 mg/kg [Mouse]. 3530 mg/kg [Rat]. DERMAL (LD50): Acute: 1060 mg/kg [Rabbit]. VAPOR (LC50): Acute: 5620 ppm 1 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Hazardous in case of skin contact (irritant), of ingestion, of inhalation. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, mucous membranes, skin, teeth. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated

or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 463°C (865.4°F)

Flash Points: CLOSED CUP: 39°C (102.2°F). OPEN CUP: 43°C (109.4°F).

Flammable Limits: LOWER: 4% UPPER: 19.9%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials, of metals.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of oxidizing materials.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.

Special Remarks on Fire Hazards:
Reacts with metals to produces flammable hydrogen gas. It will ignite on contact with potassium-tert-butoxide. A mixture of ammonium nitrate and acetic acid ignites when warmed, especially if warmed.

Special Remarks on Explosion Hazards:

Acetic acid vapors may form explosive mixtures with air. Reactions between acetic acid and the following materials are potentially explosive: 5-azidotetrazole, bromine pentafluoride, chromium trioxide, hydrogen peroxide, potassium permanganate, sodium peroxide, and phorphorus trichloride. Dilute acetic acid and dilute hydrogen can undergo an exothermic reaction if heated, forming peracetic acid which is explosive at 110 degrees C. Reaction between chlorine trifluoride and acetic acid is very violent, sometimes explosive.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Flammable liquid. Corrosive liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form: Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Absorb with an inert material and put the spilled material in an appropriate waste disposal. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
\Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Synthetic apron. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 10 STEL: 15 (ppm) [Australia] TWA: 25 STEL: 27 (mg/m3) [Australia] TWA: 10 STEL: 15 (ppm) from NIOSH TWA: 25 STEL: 37 (mg/m3) from NIOSH TWA: 10 STEL: 15 (ppm) [Canada] TWA: 26 STEL: 39 (mg/m3) [Canada] TWA: 25 STEL: 37 (mg/m3) TWA: 10 STEL: 15 (ppm) from ACGIH (TLV) [United States] [1999] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 25 (mg/m3) from OSHA (PEL) [United States]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent, vinegar-like, sour (Strong.)

Taste: Vinegar, sour (Strong.)

Molecular Weight: 60.05 g/mole

Color: Colorless. Clear (Light.)

pH (1% soln/water): 2 [Acidic.]

Boiling Point: 118.1°C (244.6°F)

Melting Point: 16.6°C (61.9°F)

Critical Temperature: 321.67°C (611°F)

Specific Gravity: 1.049 (Water = 1)

Vapor Pressure: 1.5 kPa (@ 20°C)

Vapor Density: 2.07 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.48 ppm

Water/Oil Dist. Coeff.: The product is more soluble in water; log(oil/water) = -0.2

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Easily soluble in cold water, hot water. Soluble in diethyl ether, acetone. Miscible with Glycerol, alcohol, Benzene, Carbon Tetrachloride. Practically insoluble in Carbon Disulfide.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, reducing agents, metals, acids, alkalis.

Corrosivity:
Highly corrosive in presence of stainless steel(304). Slightly corrosive in presence of aluminum, of copper. Non-corrosive in presence of stainless steel(316).

Special Remarks on Reactivity:
Reacts violently with strong oxidizing agents, acetaldehyde, and acetic anhydride. Material can react with metals, strong bases, amines, carbonates, hydroxides, phosphates, many oxides,cyanides, sulfides, chromic acid, nitric acid, hydrogen peroxide, carbonates. ammonium nitrate, ammonium thiosulfate, chlorine trifluoride, chlorosulfonic acid, perchloric acid, permanganates, xylene, oleum, potassium hydroxide, sodium hydroxide, phosphorus isocyanate, ethylenediamine, ethylene imine.

Special Remarks on Corrosivity: Moderate corrosive effect on bronze. No corrosion data on brass

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3310 mg/kg [Rat]. Acute dermal toxicity (LD50): 1060 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 5620 1 hours [Mouse].

Chronic Effects on Humans:
MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidneys, mucous membranes, skin, teeth.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: May affect genetic material and may cause reproductive effects based on animal data. No human data found.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: Extremely irritating and corrosive. Causes skin irritation (reddening and itching, inflammation). May cause blistering , tissue damage and burns. Eyes: Extremely irritating and corrosive. Causes eye irritation, lacrimation, redness, and pain. May cause burns, blurred vision, conjunctivitis, conjunctival and corneal destruction and permanent injury. Inhalation: Causes severe respiratory tract irritation. Affects the sense organs (nose, ear, eye, taste), and blood. May cause chemical pneumonitis, bronchitis, and pulmonary edema. Severe exposure may result in lung tissue damage and corrosion (ulceration) of the mucous membranes. Inhalation may also cause rhinitis, sneezing, coughing, oppressive feeling in the chest or chest pain, dyspnea, wheezing, tachypnea, cyanosis, salivation, nausea, giddiness, muscular weakness. Ingestion: Moderately toxic. Corrosive. Causes gastrointestinal tract irritation (burning and pain of the mouth, throat, and abdomen, coughing, ulceration, bleeding, nausea, abdomial spasms, vomiting, hematemesis, diarrhea. May Also affect the liver (impaired liver function), behavior (convulsions, giddines, muscular weakness), and the urinary system - kidneys (Hematuria, Albuminuria, Nephrosis, acute renal failure, acute tubular necrosis). May also cause dyspnea or asphyxia. May also lead to shock, coma and death. Chronic Potential Health Effects: Chronic exposure via ingestion may cause blackening or erosion of the teeth and jaw necrosis, pharyngitis, and gastritis. It may also behavior (similar to acute ingestion), and metabolism (weight loss). Chronic exposure via inhalation may cause asthma and/or bronchitis with cough, phlegm, and/or shortness of breath . It may also affect the blood (decreased leukocyte count), and urinary system (kidneys). Repeated or prolonged skin contact may cause thickening, blackening, and cracking of the skin.

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 423 mg/l 24 hours [Fish (Goldfish)]. 88 ppm 96 hours [Fish (fathead minnow)]. 75 ppm 96 hours [Fish (bluegill sunfish)]. >100 ppm 96 hours [Daphnia].

BOD5 and COD: BOD-5: 0.34-0.88 g oxygen/g

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification:

CLASS 3: Flammable liquid. Class 8: Corrosive material

Identification: : Acetic Acid, Glacial UNNA: 2789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
New York release reporting list: Acetic acid Rhode Island RTK hazardous substances: Acetic acid Pennsylvania RTK: Acetic acid Florida: Acetic acid Minnesota: Acetic acid Massachusetts RTK: Acetic acid New Jersey: Acetic acid California Director's List of Hazardous Subtances (8 CCR 339): Acetic acid TSCA 8(b) inventory: Acetic acid CERCLA: Hazardous substances.: Acetic acid: 5000 lbs. (2268 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS E: Corrosive liquid.

DSCL (EEC):
R10- Flammable. R35- Causes severe burns. S23- Do not breathe gas/fumes/vapour/spray [***] S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 2

Reactivity: 0

Personal Protection: H

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 2

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves (impervious). Synthetic apron. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 03:35 PM

Last Updated: 11/01/2010 12:00 PM

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MATERIAL SAFETY DATA SHEET

FILE NO. 9636, 9637, 9638, 9616, 11360
NAME OF PRODUCT: AW Hydraulic Oil ISO 46 **MSDS DATE:** December, 2009

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: AW Hydraulic Oil ISO 46
SYNONYMS: hydraulic fluid
PRODUCT CODES: 9616,9636,9637,9637Tray,9638,11360, CG46AWBlue

MANUFACTURER: CGF INC
DIVISION: N/A
ADDRESS: 317 Peoples Avenue Rockford, IL 61104 USA

EMERGENCY PHONE: 800/424-9300
CHEMTREC PHONE: 800/424-9300
OTHER CALLS: 815-967-4400
FAX PHONE: 815-967-4404

PRODUCT USE: Hydraulic Fluid
PREPARED BY: Irena Larson/Denise Brauer

SECTION 1 NOTES:

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT: **Petroleum base oils, additive package.**

CAS NO.	% WT	% VOL	SARA 313 REPORTABLE
64741-88-4	75-85		None
64742-01-4	15-25		None
Proprietary Additive(s)	0.5-1.5		None

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This material is not considered hazardous according to OSHA criteria.

ROUTES OF ENTRY: Skin contact or inhalation.

POTENTIAL HEALTH EFFECTS

EYES: Contact may cause mild eye irritation including stinging, watering, and redness.

SKIN: Contact may cause mild skin irritation including redness and a burning sensation. Prolonged or repeated contact can defat the skin, causing drying and cracking of the skin and possibly dermatitis (inflammation). No harmful effects from skin absorption are expected.

INGESTION: No harmful effects expected from ingestion.

INHALATION: No information available on acute toxicity.

ACUTE HEALTH HAZARDS: No

CHRONIC HEALTH HAZARDS: No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Skin disorders may be aggravated by exposure.

CARCINOGENICITY

OSHA: None **ACGIH: None** **NTP:** None **IARC: None**
OTHER:

SECTION 3 NOTES:

SECTION 4: FIRST AID MEASURES

EYES: If irritation or redness develops, flush eyes with clean water. If symptoms persist, seek medical attention.

SKIN: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with a mild soap and water or a waterless hand cleaner. If irritation persists, seek medical attention.

INGESTION: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

INHALATION: If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing wound. Often these injuries require emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

Acute aspirations of large amounts of mineral oil-laden material may produce serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

SECTION 4 NOTES:

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, foam, or water spray is recommended.

SPECIAL FIRE FIGHTING PROCEDURES:
Water or foam may cause frothing of materials heated above 212 F. Carbon dioxide can displace oxygen. Use caution when applying dioxide in confined spaces.

SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters muct use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of fire.

HAZARDOUS DECOMPOSITION PRODUCTS: No data

Flash Point: C(F) : >210(410) (ASTM D-92)
Flammable Limits (approx. % vol. in air)- LEL: 0.9%, UEL: 7.0%
NFPA HAZARD ID: Health: 1, Flammability: 1, Reactivity: 0

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES:
Personal Precautions:
This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant.
Environmental Precautions: Stop spill/release if it can be done with minimal risk. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Contact appropriate agency for spills into or upon navigable waters that cause a sheen or discoloration on the water surface.

Methods for Containment and Clean Up:
Notify fire authorities and appropriate regulatory authorities. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Spilled material may be absorbed into an appropriate absorbent material.

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE:
Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection

apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment. Do not enter confined spaces such as tanks or pits without following proper entry procedures. Do not wear contaminated clothing or shoes. "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Keep container(s) tightly closed. Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Componet	**ACGIH**	**OSHA**
Lubricant Base Oil-Petroleum	TWA: 5mg/m^3	TWA: 5mg/m^3
	STEL: 10mg/m^3	as Oil mist, if generated
	As oil mist, if generated	

ENGINEERING CONTROLS: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

RESPIRATORY PROTECTION: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used. A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (MUC) as directed by regulation or the manufacturer's instructions, in oxygen deficient (less than 19.5 percent oxygen) situations, or other conditions that are immediately dangerous to life and health (IDLH).

EYE PROTECTION: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

SKIN PROTECTION: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the performance of their products. Suggested protective materials: Nitrile

SECTION 8 NOTES: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear Blue Liquid

ODOR: mild petroleum

PHYSICAL STATE: Liquid

pH AS SUPPLIED: Not applicable
pH (Other):
BOILING POINT: No data
F: >600
C: >316

FLASH POINT:
F: >410
C: >210
METHOD USED: (ASTM D-92)

AUTOIGNITION TEMPERATURE:
F: 671
C: 355

MELTING POINT: No data
F:
C:
FREEZING POINT: No data
F:

MATERIAL SAFETY DATA SHEET

FILE NO. 9636, 9637, 9638, 9616, 11360
NAME OF PRODUCT: AW Hydraulic Oil ISO 46 **MSDS DATE:** December, 2009

C:

VAPOR PRESSURE (mmHg): <1
@ 20 C :< 0.1

VAPOR DENSITY (AIR = 1): >2
@
F: 68
C: 20
SPECIFIC GRAVITY (H2O = 1): 0.87
@
F: 60
C: 15.6
EVAPORATION RATE: n/a

BASIS (=1):

SOLUBILITY IN WATER: not soluble

PERCENT SOLIDS BY WEIGHT: n/a

PERCENT VOLATILE: Negligible
BY WT/ BY VOL @
F: 68
C: 20
VOLATILE ORGANIC COMPOUNDS (VOC): no data

WITH WATER: LBS/GAL
WITHOUT WATER: LBS/GAL

MOLECULAR WEIGHT: no data
VISCOSITY:
200-300 SUS @ 100 Degree F
@ 40 C cST 47.25

SECTION 9 NOTES: Data represents typical values and are not intended to be specifications.

SECTION 10: STABILITY AND REACTIVITY

	STABLE	UNSTABLE
STABILITY:	**YES**	

CONDITIONS TO AVOID (STABILITY): Avoid excessive heat, formations of vapors or mists.

INCOMPATIBILITY (MATERIAL TO AVOID): Strong oxidizing agents

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: None under normal storage.

HAZARDOUS POLYMERIZATION: No

CONDITIONS TO AVOID (POLYMERIZATION): n/a

SECTION 10 NOTES:

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION:
Carcinogenicity: The petroleum base oils contained in this product have been highly refined by a variety of processes including solvent extraction, hydrotreating, and/or dewaxing to remove aromatics and improve performance characteristics. No components in this formulation have been identified as a carcinogen.

Component	Oral LD50	Dermal LD50	Inhalation LC50
Lubricant Base Oil	**>5g/kg**	**>2g/kg**	**No data**

SECTION 11 NOTES:

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: Ecotoxicological data have not been determined specifically for this product. Information given is based on knowledge of the components and the ecotoxicology of similar products.
Acute Toxicity: Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.
Mobility: Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.
Persistence/degradability: Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
Bioaccumulation : Contains components with the potential to bioaccumulate.
Other Adverse Effects: Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential

SECTION 12 NOTES:

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:
Material Disposal: Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
Container Disposal: Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations.

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: Not regulated
PROPER SHIPPING NAME:
HAZARD CLASS:
ID NUMBER:
PACKING GROUP:
LABEL STATEMENT:

WATER TRANSPORTATION: Not regulated
PROPER SHIPPING NAME:
HAZARD CLASS:
ID NUMBER:
PACKING GROUP:
LABEL STATEMENTS:

AIR TRANSPORTATION: Not regulated
PROPER SHIPPING NAME:
HAZARD CLASS:
ID NUMBER:
PACKING GROUP:
LABEL STATEMENTS:

OTHER AGENCIES:

SECTION 14 NOTES:

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TSCA (TOXIC SUBSTANCE CONTROL ACT): All components of this formulation are listed on the US EPA-TSCA inventory or not regulated under TSCA.

EU Labeling: Product is not dangerous as defined by the European Union Dangerous Substances/Preparations Directives. EU labeling is not required.

Governmental Inventory Status: All components comply with TSCA, EINECS/ELINCS, AICS, METI, DSL, KOREA, and PHILIPPINES.

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT): This product contains no"EXTREMELY HAZARDOUS SUBSTANCES".

311/312 HAZARD CATEGORIES: None
Acute Health: No
Chronic Health: No
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

313 REPORTABLE INGREDIENTS: This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

STATE REGULATIONS: This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65:
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

INTERNATIONAL REGULATIONS:

Canadian Regulations:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
None

SECTION 15 NOTES:

SECTION 16: OTHER INFORMATION

OTHER INFORMATION:

PREPARATION INFORMATION: Issue Date: August 2009 Rev. #1

DISCLAIMER:
The information presented herein has been compiled from sources considered to be dependable and accurate to the best of Cutting & Grinding Fluids Inc., knowledge. However, CGF INC., makes no warranty whatsoever expressed or implied of merchantability or fitness for the particular purpose, regarding the accuracy of such data or the results to be obtained from the use thereof. Cutting & Grinding Fluids, Inc. assumes no responsibility for the injury to recipient or to the third persons or for any damage to any property and recipient assumes all such risks.

Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909
US GHS

Synonyms: Ultra Low Sulfur Diesel; Low Sulfur Diesel; No. 2 Diesel; Motor Vehicle Diesel Fuel; Non-Road Diesel Fuel; Locomotive/Marine Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Skin Corrosion/Irritation – Category 2
Germ Cell Mutagenicity – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Causes skin irritation.
Suspected of causing genetic defects.
Suspected of causing cancer.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/mist/vapours/spray.

Response

In case of fire: Use water spray, fog or foam to extinguish.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.
IF exposed or concerned: Get medical advice/attention.

Storage

Store in a well-ventilated place. Keep cool.
Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-34-6	Fuels, diesel, no. 2	100
91-20-3	Naphthalene	<0.1

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, and other gaseous agents.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

Safety Data Sheet

Material Name: Diesel Fuel, All Types **SDS No. 9909**

Naphthalene (91-20-3)

ACGIH: 10 ppm TWA
15 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 10 ppm TWA; 50 mg/m3 TWA
NIOSH: 10 ppm TWA; 50 mg/m3 TWA
15 ppm STEL; 75 mg/m3 STEL

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear, straw-yellow.	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	320 to 690 °F (160 to 366 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.83-0.876 @ 60°F (16°C)
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	>125 °F (>52 °C) minimum	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.5	**Lower Flammability Limit (LFL):**	0.6
Burning Rate:	ND	**Auto Ignition:**	494°F (257°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This material has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

B: Component Carcinogenicity

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuels, diesel, no. 2 (68476-34-6)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]	
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]	

96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

Shipping Name: Diesel Fuel

NA #: 1993 **Hazard Class:** 3 **Packing Group:** III

Placard:

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Naphthalene (91-20-3)

CERCLA: 100 lb final RQ; 45.4 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

Safety Data Sheet

Material Name: Diesel Fuel, All Types **SDS No. 9909**

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the de minimis levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right- To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Fuels, diesel, no. 2	68476-34-6	No	No	No	Yes	No	No
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

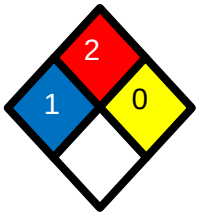
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Fuels, diesel, no. 2	68476-34-6	Yes	DSL	EINECS
Naphthalene	91-20-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	1
Fire	2
Reactivity	0



HMIS® Hazard Rating

Health	1*	Slight
Fire	2	Moderate
Physical	0	Minimal
		*Chronic

Safety Data Sheet

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43°C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer	REL	Recommended Exposure Limit (NIOSH)
MSHA	Mine Safety and Health Administration	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
NFPA	National Fire Protection Association (617)770-3000	SCBA	Self-Contained Breathing Apparatus
NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	STEL	Short-Term Exposure Limit (generally 15 minutes)
NTP	National Toxicology Program	TLV	Threshold Limit Value (ACGIH)
OPA	Oil Pollution Act of 1990	TSCA	Toxic Substances Control Act
OSHA	U.S. Occupational Safety & Health Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	WEEL	Workplace Environmental Exposure Level (AIHA)
RCRA	Resource Conservation and Recovery Act	WHMIS	Workplace Hazardous Materials Information System (Canada)

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Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

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MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name SUPER GEL-X®

Version # 12

Revision date 21-February-2009

Chemical description Smectite Clay

Manufacturer

CETCO
Drilling Products Group
2870 Forbs Avenue
Hoffman Estates, IL 60192 US
safetydata@amcol.com
http://www.cetco.com/
General Information (800) 527-9948
CHEMTREC® (800) 424-9300

2. Hazards Identification

Emergency overview Material can be slippery when wet

Potential health effects

Routes of exposure Inhalation.

Eyes Dust or powder may irritate eye tissue.

Skin Non-irritating to the skin.

Inhalation Repeated or prolonged inhalation may cause toxic effects. For additional information on inhalation hazards, see Section 11 of this safety data sheet.

Ingestion No significant adverse effects are expected upon ingestion of the product.

Target organs Lungs.

Chronic effects This product has the potential for generation of respirable dust during handling and use. Dust may contain respirable crystalline silica. Overexposure to dust may result in pneumocononiosis, a respiratory disease caused by inhalation of mineral dust, which can lead to fibrotic changes to the lung tissue, or silicosis, a respiratory disease caused by inhalation of silica dust, which can lead to inflammation and fibrosis of the lung tissue. Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

3. Composition / Information on Ingredients

Components	CAS #	Percent
BENTONITE	1302-78-9	60 - 100
Non-hazardous and other components below reportable levels		> 0.0001

Composition comments Bentonite contains naturally occurring crystalline silica (not listed in Annex I of Directive 67/548/EEC) in quantities less than 6%. Occupational Exposure Limits for impurities are listed in Section 8.

4. First Aid Measures

First aid procedures

Eye contact Flush eyes immediately with large amounts of water. If irritation persists get medical attention.

Skin contact No special measures required. Get medical attention if irritation develops or persists.

Inhalation Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get medical attention, if needed.

Ingestion No special measures required. If ingestion of a large amount does occur, seek medical attention.

Notes to physician Provide general supportive measures and treat symptomatically.

5. Fire Fighting Measures

Flammable properties This material will not burn.

Extinguishing media

Suitable extinguishing media Use any media suitable for the surrounding fires. Dry chemical, CO2, water spray or regular foam.

Protection of firefighters

Protective equipment for firefighters Material can be slippery when wet

Special protective equipment for fire-fighters Material can be slippery when wet

Explosion data

Sensitivity to mechanical impact Not available.

Sensitivity to static discharge Not available.

Hazardous combustion products None known.

6. Accidental Release Measures

Personal precautions Material can be slippery when wet. Wear a dust mask if dust is generated above exposure limits.

Environmental precautions No special environmental precautions required.

Methods for cleaning up Avoid the generation of dusts during clean-up. Collect dust or particulates using a vacuum cleaner with a HEPA filter. Reduce airborne dust and prevent scattering by moistening with water.

7. Handling and Storage

Handling Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. In case of insufficient ventilation, wear suitable respiratory equipment.

Storage Guard against dust accumulation of this material. No special storage conditions required. No special restrictions on storage with other products.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	10 mg/m3	Inhalable particles.
		3 mg/m3	Respirable particles.
QUARTZ (14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

Canada - Alberta

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	3 mg/m3	Respirable particles.
		10 mg/m3	Total particulate.
QUARTZ (14808-60-7)	TWA	0.1 mg/m3	Respirable particles.

Canada - British Columbia

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
QUARTZ (14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

Canada - Ontario

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	10 mg/m3	Inhalable particulate.
		3 mg/m3	Respirable particles.
QUARTZ (14808-60-7)	TWA	0.1 mg/m3	Respirable fraction.

Canada - Quebec

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	10 mg/m3	Total dust.
QUARTZ (14808-60-7)	TWA	0.1 mg/m3	Respirable dust.

Exposure guidelines Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

Engineering controls If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. If engineering measures are not sufficient to maintain concentrations of dust particulates below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Eye / face protection Wear dust goggles. Eye wash fountain is recommended.

Skin protection No special protective equipment required.

Respiratory protection Use a particulate filter respirator for particulate concentrations exceeding the Occupational Exposure Limit.

General hygeine considerations Use good industrial hygiene practices in handling this material.

9. Physical & Chemical Properties

Appearance Not available.

Color Not available.

Odor None.

Odor threshold Not available.

Physical state Solid.

Form Granular. Powder. Pellets. or Chips.

pH 7 - 11

Melting point Not available.

Freezing point Not available.

Boiling point Not available.

Flash point Non-flammable

Evaporation rate Not available.

Flammability Not available.

Flammability limits in air, upper, % by volume Not available.

Flammability limits in air, lower, % by volume Non-explosive

Vapor pressure Not available.

Vapor density Not available.

Specific gravity 2.5497 estimated

Relative density Not available.

Solubility (water) Negligible

Partition coefficient (n-octanol/water) Not available.

Auto-ignition temperature Not available.

Decomposition temperature Not available.

VOC 0 % estimated

10. Chemical Stability & Reactivity Information

Chemical stability Stable at normal conditions.

Conditions to avoid None known.

Incompatible materials None known.

Hazardous decomposition products None known.

Possibility of hazardous reactions Will not occur.

11. Toxicological Information

Chronic effects

In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However in making the overall evaluation, IARC noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibres, 1997, Vol. 68, IARC, Lyon, France.)

In June 2003, SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk..." (SCOEL SUM Doc 94-final, June 2003)

According to the current state of the art, worker protection against silicosis can be consistently assured by respecting the existing regulatory occupational exposure limits. Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

Carcinogenicity

IARC Monographs on Occupational Exposures to Chemical Agents: Overall evaluation

QUARTZ (14808-60-7)	1 Human carcinogen.

12. Ecological Information

Ecotoxicological data

Product	Test Results
SUPER GEL-X®	LC50 Fish: 19005 mg/l 96.00 Hours estimated

Components	Test Results
BENTONITE (1302-78-9)	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): 19000 mg/l 96.00 Hours

* Estimates for product may be based on additional component data not shown.

Ecotoxicity This material is not expected to be harmful to aquatic life.

Environmental effects Based on the physical properties of this product, significant environmental persistence and bioaccumulation would not be expected.

Persistence and degradability Not available.

13. Disposal Considerations

Disposal instructions Dispose in accordance with all applicable regulations. Material should be recycled if possible.

14. Transport Information

TDG

Not regulated as dangerous goods.

15. Regulatory Information

WHMIS classification D2A - Other Toxic Effects-VERY TOXIC

WHMIS labeling

WHMIS status Controlled

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

Recommended restrictions

Workers (and your customers or users in the case of resale) should be informed of the potential presence of respirable dust and respirable crystalline silica as well as their potential hazards. Appropriate training in the proper use and handling of this material should be provided as required under applicable regulations.

Further information

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

HMIS ratings

NFPA ratings

Health: 1
Flammability: 0
Instability: 0

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The manufacturer expressly does not make any representations, warranties, or guarantees as to its accuracy, reliability or completeness nor assumes any liability, for its use. It is the user's responsibility to verify the suitability and completeness of such information for each particular use.

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Issue date

21-February-2009

Other information

CETCO is an AMCOL International company.

Canadian preparer address

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2870 Forbs Avenue
Hoffman Estates, IL 60192
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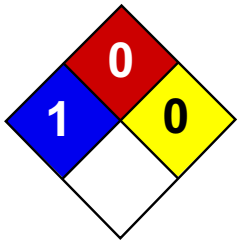
+1-847-851-1500
safetydata@amcol.com



Material Safety Data Sheet
Magnesium hydroxide MSDS

Section 1: Chemical Product and Company Identification

Product Name: Magnesium hydroxide

Catalog Codes: SLM2437, SLM3811, SLM1663

CAS#: 1309-42-8

RTECS: OM3570000

TSCA: TSCA 8(b) inventory: Magnesium hydroxide

CI#: Not available.

Synonym:

Chemical Name: Not available.

Chemical Formula: Mg(OH)2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Magnesium hydroxide	1309-42-8	100

Toxicological Data on Ingredients: Not applicable.

Section 3: Hazards Identification

Potential Acute Health Effects: Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

Section 4: First Aid Measures

Eye Contact: Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention.

Serious Skin Contact: Not available.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation: Not available.

Ingestion:
Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill:
Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

Large Spill:
Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

Section 7: Handling and Storage

Precautions: No specific safety phrase has been found applicable for this product.

Storage:
No specific storage is required. Use shelves or cabinets sturdy enough to bear the weight of the chemicals. Be sure that it is not necessary to strain to reach materials, and that shelves are not overloaded.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

Personal Protection: Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Solid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 58.32 g/mole

Color: Not available.

pH (1% soln/water): Not available.

Boiling Point: Not available.

Melting Point: Decomposes.

Critical Temperature: Not available.

Specific Gravity: 2.36 (Water = 1)

Vapor Pressure: Not applicable.

Vapor Density: Not available.

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Not available.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans: Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the original product.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: Not a DOT controlled material (United States).

Identification: Not applicable.

Special Provisions for Transport: Not applicable.

Section 15: Other Regulatory Information

Federal and State Regulations: TSCA 8(b) inventory: Magnesium hydroxide

Other Regulations: Not available..

Other Classifications:

WHMIS (Canada): Not controlled under WHMIS (Canada).

DSCL (EEC):
This product is not classified according to the EU regulations.

HMIS (U.S.A.):

Health Hazard: 1

Fire Hazard: 0

Reactivity: 0

Personal Protection: E

National Fire Protection Association (U.S.A.):

Health: 1

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:22 PM

Last Updated: 11/01/2010 12:00 PM

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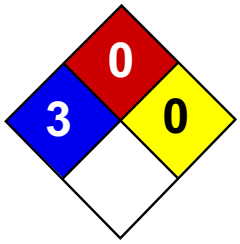

Material Safety Data Sheet
Phosphoric acid, 85% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Phosphoric acid, 85%

Catalog Codes: SLP5569, SLP4555, SLP1732

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Phosphoric Acid; Water

CI#: Not available.

Synonym: Phosphoric Acid 85%; Phosphoric Acid; Orthophosphoric acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Phosphoric Acid	7664-38-2	85-88
Water	7732-18-5	12-15

Toxicological Data on Ingredients: Phosphoric Acid: ORAL (LD50): Acute: 1530 mg/kg [Rat]. DERMAL (LD50): Acute: 2740 mg/kg [Rabbit]. DUST (LC50): Acute: >850 mg/m 1 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, liver, skin, eyes, bone marrow. Repeated

or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Reacts with metals to liberate flammable hydrogen gas. Formation of flammable gases with aldehydes, cyanides, mercaptins, and sulfides.

Special Remarks on Explosion Hazards: Mixtures with nitromethane are explosive. (Phosphoric Acid)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, combustible materials, metals, alkalis. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Phosphoric Acid TWA: 1 STEL: 3 (mg/m3) from ACGIH (TLV) [United States] TWA: 1 STEL: 3 (mg/m3) from OSHA (PEL) [United States] TWA: 1 STEL: 3 (mg/m3) from NIOSH TWA: 1 STEL: 3 (mg/m3) [Mexico]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Syrupy liquid Viscous liquid.)

Odor: Odorless.

Taste: Acid.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Acidic.

Boiling Point: 158°C (316.4°F)

Melting Point: 21°C (69.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.685 @ 25 C (Water = 1)

Vapor Pressure: 0.3 kPa (@ 20°C)

Vapor Density: 3.4 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Easily soluble in hot water. Soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, combustible materials, metals, alkalis.

Corrosivity:
Extremely corrosive in presence of copper, of stainless steel(304), of stainless steel(316). Highly corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts with metals to liberate flammable hydrogen gas. Incompatible with sodium tetrahydroborate producing a violent exothermic reaction. Heat generated with: alcohols, glycols, aldehydes, amides, amines, azo-compounds, carbamates, caustics, esters, ketones, phenols and cresols, organophosphates, epoxides, combustible materials, unsaturated halides, organic peroxides. Formation of flammable gases, with aldehydes, cyanides, mercaptins, and sulfides. Formation of toxic fumes with cyanides, fluorides, halogenated organics, sulfides, and organic peroxides. Do not mix with solutions containing bleach or ammonia. Incompatible with nitromethane, chlorides + staiinless steel. (Phosphoric Acid)

Special Remarks on Corrosivity:
Minor corrosive effect on bronze. Severe corrosive effect on brass. Corrosive to ferrous metals and alloys.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 1530 mg/kg [Rat]. Acute dermal toxicity (LD50): 2740 mg/kg [Rabbit].

Chronic Effects on Humans: May cause damage to the following organs: blood, liver, skin, eyes, bone marrow.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Corrosive and causes severe skin irritation and can cause severe skin burns. May affect behavior (somnolence or excitement) if absorbed through skin. Eyes: Corrosive. Liquid or vapor causes severe eye irritation and can cause severe eye burns leading to permanent corneal damage or chemical conjunctivitis. Ingestion: May be harmful if swallowed. Causes irritation and burns of the gastrointestinal (digestive) tract. Causes severe pain, nausea, vomiting, diarrhea hematemesis, gastrointestinal hemmorrhaging, and shock. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May affect behavior and urinary system, liver (hepatocellular damage, hepatic enzymes increased), blood (blood dyscrasia). May also

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Phosphoric acid (Phosphoric Acid) UNNA: 1805 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Phosphoric Acid Illinois toxic substances disclosure to employee act: Phosphoric acid Illinois chemical safety act: Phosphoric acid New York release reporting list: Phosphoric acid Rhode Island RTK hazardous substances: Phosphoric acid Pennsylvania RTK: Phosphoric acid Minnesota: Phosphoric acid Massachusetts RTK: Phosphoric acid Massachusetts spill list: Phosphoric acid New Jersey: Phosphoric acid New Jersey spill list: Phosphoric acid Louisiana spill reporting: Phosphoric acid California Director's list of hazardous substances: Phosphoric acid TSCA 8(b) inventory: Phosphoric Acid; Water SARA 313 toxic chemical notification and release reporting: Phosphoric acid CERCLA: Hazardous substances.: Phosphoric acid: 5000 lbs. (2268 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive liquid.

DSCL (EEC):
R34- Causes burns. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:47 PM

Last Updated: 11/01/2010 12:00 PM

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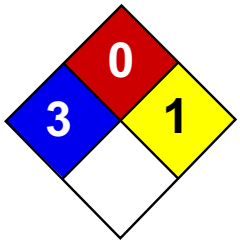

Material Safety Data Sheet
Sodium Hydroxide, 50% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Hydroxide, 50%

Catalog Codes: SLS3127, SLS4549

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Sodium hydroxide; Water

CI#: Not applicable.

Synonym: Sodium Hydroxide, 50% Solution

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hydroxide	1310-73-2	50
Water	7732-18-5	50

Toxicological Data on Ingredients: Sodium hydroxide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation

leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately. Finish by rinsing thoroughly with running water to avoid a possible infection.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Sodium hydroxide reacts to form explosive products with ammonia + silver nitrate. Benzene extract of allyl benzenesulfonate prepared from allyl alcohol, and benzene sulfonyl chloride in presence of aquesous sodium hydroxide, under vacuum distillation, residue darkened and exploded. Sodium Hydroxde + impure tetrahydrofuran, which can contain peroxides, can cause serious explosions. Dry mixtures of sodium hydroxide and sodium tetrahydroborate liberate hydrogen explosively at 230-270 deg. C. Sodium Hydroxide reacts with sodium salt of trichlorophenol + methyl alcohol + trichlorobenzene + heat to cause an explosion. (Sodium hydroxide)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Sodium hydroxide STEL: 2 (mg/m3) from ACGIH (TLV) [United States] TWA: 2 CEIL: 2 (mg/m3) from OSHA (PEL) [United States] CEIL: 2 (mg/m3) from NIOSHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Alkaline. Bitter. (Strong.)

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Basic.

Boiling Point: 140°C (284°F)

Melting Point: 12°C (53.6°F)

Critical Temperature: Not available.

Specific Gravity: 1.53 (Water = 1)

Vapor Pressure: The highest known value is 2.3 kPa (@ 20°C) (Water).

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, water/moisture

Incompatibility with various substances:
Reactive with oxidizing agents, reducing agents, metals, acids, alkalis. Slightly reactive with water

Corrosivity:
Extremely corrosive in presence of aluminum, brass. Corrosive in presence of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Hygroscopic. Much heat is evolved when solid material is dissolved in water. Therefore cold water and caution must be used for this process. Generates considerable heat when a sodium hydroxide solution is mixed with an acid Sodium hydroxide solution and octanol + diborane during a work-up of a reaction mixture of oxime and diborane in tetrahyrofuran is very exothermic, a mild explosion being noted on one occassion. Reactive with water, acids (mineral, non-oxidizing, e.g. hydrochloric, hydrofluoric acid, muriatic acid, phosphoric), acids (mineral, oxidizing e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), acids (organic e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, foraldehyde), carbamates (e.g. carbanolate, carbofuran), esters (e.g. butyl acetate, ethyl acetate, propyl formate), halogenated organics (dibromoethane, hexachlorobenzene, methyl chloride, trichloroethylene), isocyanates (e.g. methyl isocyanate), ketones (acetone, acetophenone, MEK, MIBK), acid chlorides, strong bases, strong oxidizing agents, strong reducing agents, flammable liquids, powdered metals and metals (i.e aluminum, tin, zinc, hafnium, raney nickel), metals (alkali and alkaline e.g. cesium, potassium, sodium), metal compounds (toxic e.g. berylium, lead acetate, nickel carbonyl, tetraethyl lead), mitrides (e.g. potassium nitride, sodium nitride), nitriles (e.g. acetonitrile, methyl cyanide), nitro compounds (organic e.g. nitrobenzene, nitromethane), acetic anhydride, hydroquinone, chlorohydrin, chlorosulfonic acid, ethylene cyanohydrin, glyoxal, hydrosulfuric acid, oleum, propiolactone, acylonitrile, phorosous pentoxide, chloroethanol, chloroform-methanol, tetrahydroborate, cyanogen azide, 1,2,4,5 tetrachlorobenzene, cinnamaldehyde. Reacts with formaldehyde hydroxide to yield formic acid, and hydrogen. (Sodium hydroxide)

Special Remarks on Corrosivity: Very caustic to aluminum and other metals in presence of moisture.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Investigation as a mutagen (cytogenetic analysis), but no data available. (Sodium hydroxide)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May be harmful if absorbed through skin. Causes severe skin irritation and burns. May cause deep penetrating ulcers of the skin. Eyes: Causes severe eye irritation and burns. May cause chemical conjunctivitis and corneal damage. Inhalation: Harmful if inhaled. Causes severe irritation of the respiratory tract and mucous membranes with coughing, burns, breathing difficulty, and possible coma. Irritation may lead the chemical pneumonitis and pulmonary edema. Causes chemical burns to the respiratory tract and mucous membranes. Ingestion: May be fatal if swallowed. May cause severe and permanent damage to the digestive tract. Causes

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sodium hydroxide, solution (Sodium hydroxide) UNNA: UN1824 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Sodium hydroxide Illinois chemical safety act: Sodium hydroxide New York release reporting list: Sodium hydroxide Rhode Island RTK hazardous substances: Sodium hydroxide Pennsylvania RTK: Sodium hydroxide Minnesota: Sodium hydroxide Massachusetts RTK: Sodium hydroxide New Jersey: Sodium hydroxide Louisiana spill reporting: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide; Water CERCLA: Hazardous substances.: Sodium hydroxide: 1000 lbs. (453.6 kg);

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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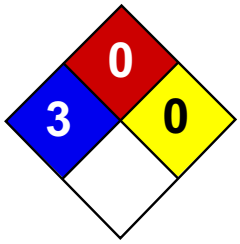

Material Safety Data Sheet
Phosphoric acid, 85% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Phosphoric acid, 85%

Catalog Codes: SLP5569, SLP4555, SLP1732

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Phosphoric Acid; Water

CI#: Not available.

Synonym: Phosphoric Acid 85%; Phosphoric Acid; Orthophosphoric acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call: 1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Phosphoric Acid	7664-38-2	85-88
Water	7732-18-5	12-15

Toxicological Data on Ingredients: Phosphoric Acid: ORAL (LD50): Acute: 1530 mg/kg [Rat]. DERMAL (LD50): Acute: 2740 mg/kg [Rabbit]. DUST (LC50): Acute: >850 mg/m 1 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive). Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, liver, skin, eyes, bone marrow. Repeated

or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Reacts with metals to liberate flammable hydrogen gas. Formation of flammable gases with aldehydes, cyanides, mercaptins, and sulfides.

Special Remarks on Explosion Hazards: Mixtures with nitromethane are explosive. (Phosphoric Acid)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, combustible materials, metals, alkalis. May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Phosphoric Acid TWA: 1 STEL: 3 (mg/m3) from ACGIH (TLV) [United States] TWA: 1 STEL: 3 (mg/m3) from OSHA (PEL) [United States] TWA: 1 STEL: 3 (mg/m3) from NIOSH TWA: 1 STEL: 3 (mg/m3) [Mexico]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Syrupy liquid Viscous liquid.)

Odor: Odorless.

Taste: Acid.

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Acidic.

Boiling Point: 158°C (316.4°F)

Melting Point: 21°C (69.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.685 @ 25 C (Water = 1)

Vapor Pressure: 0.3 kPa (@ 20°C)

Vapor Density: 3.4 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility:
Easily soluble in hot water. Soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, combustible materials, metals, alkalis.

Corrosivity:
Extremely corrosive in presence of copper, of stainless steel(304), of stainless steel(316). Highly corrosive in presence of aluminum. Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts with metals to liberate flammable hydrogen gas. Incompatible with sodium tetrahydroborate producing a violent exothermic reaction. Heat generated with: alcohols, glycols, aldehydes, amides, amines, azo-compounds, carbamates, caustics, esters, ketones, phenols and cresols, organophosphates, epoxides, combustible materials, unsaturated halides, organic peroxides. Formation of flammable gases, with aldehydes, cyanides, mercaptins, and sulfides. Formation of toxic fumes with cyanides, fluorides, halogenated organics, sulfides, and organic peroxides. Do not mix with solutions containing bleach or ammonia. Incompatible with nitromethane, chlorides + staiinless steel. (Phosphoric Acid)

Special Remarks on Corrosivity:
Minor corrosive effect on bronze. Severe corrosive effect on brass. Corrosive to ferrous metals and alloys.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 1530 mg/kg [Rat]. Acute dermal toxicity (LD50): 2740 mg/kg [Rabbit].

Chronic Effects on Humans: May cause damage to the following organs: blood, liver, skin, eyes, bone marrow.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (irritant), of ingestion, . Hazardous in case of skin contact (corrosive, permeator), of eye contact (corrosive).

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Corrosive and causes severe skin irritation and can cause severe skin burns. May affect behavior (somnolence or excitement) if absorbed through skin. Eyes: Corrosive. Liquid or vapor causes severe eye irritation and can cause severe eye burns leading to permanent corneal damage or chemical conjunctivitis. Ingestion: May be harmful if swallowed. Causes irritation and burns of the gastrointestinal (digestive) tract. Causes severe pain, nausea, vomiting, diarrhea hematemesis, gastrointestinal hemmorrhaging, and shock. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract. May affect behavior and urinary system, liver (hepatocellular damage, hepatic enzymes increased), blood (blood dyscrasia). May also

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Phosphoric acid (Phosphoric Acid) UNNA: 1805 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Phosphoric Acid Illinois toxic substances disclosure to employee act: Phosphoric acid Illinois chemical safety act: Phosphoric acid New York release reporting list: Phosphoric acid Rhode Island RTK hazardous substances: Phosphoric acid Pennsylvania RTK: Phosphoric acid Minnesota: Phosphoric acid Massachusetts RTK: Phosphoric acid Massachusetts spill list: Phosphoric acid New Jersey: Phosphoric acid New Jersey spill list: Phosphoric acid Louisiana spill reporting: Phosphoric acid California Director's list of hazardous substances: Phosphoric acid TSCA 8(b) inventory: Phosphoric Acid; Water SARA 313 toxic chemical notification and release reporting: Phosphoric acid CERCLA: Hazardous substances.: Phosphoric acid: 5000 lbs. (2268 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS E: Corrosive liquid.

DSCL (EEC):
R34- Causes burns. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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Last Updated: 11/01/2010 12:00 PM

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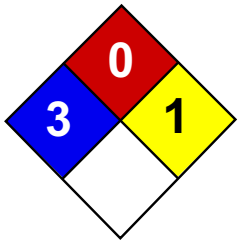

Material Safety Data Sheet
Sodium Hydroxide, 50% MSDS

Section 1: Chemical Product and Company Identification

Product Name: Sodium Hydroxide, 50%

Catalog Codes: SLS3127, SLS4549

CAS#: Mixture.

RTECS: Not applicable.

TSCA: TSCA 8(b) inventory: Sodium hydroxide; Water

CI#: Not applicable.

Synonym: Sodium Hydroxide, 50% Solution

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Sodium hydroxide	1310-73-2	50
Water	7732-18-5	50

Toxicological Data on Ingredients: Sodium hydroxide LD50: Not available. LC50: Not available.

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance is toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation

leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention immediately. Finish by rinsing thoroughly with running water to avoid a possible infection.

Skin Contact:
In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards:
Sodium hydroxide reacts to form explosive products with ammonia + silver nitrate. Benzene extract of allyl benzenesulfonate prepared from allyl alcohol, and benzene sulfonyl chloride in presence of aquesous sodium hydroxide, under vacuum distillation, residue darkened and exploded. Sodium Hydroxde + impure tetrahydrofuran, which can contain peroxides, can cause serious explosions. Dry mixtures of sodium hydroxide and sodium tetrahydroborate liberate hydrogen explosively at 230-270 deg. C. Sodium Hydroxide reacts with sodium salt of trichlorophenol + methyl alcohol + trichlorobenzene + heat to cause an explosion. (Sodium hydroxide)

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:
Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, reducing agents, metals, acids, alkalis, moisture.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value.

Personal Protection:
Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
Sodium hydroxide STEL: 2 (mg/m3) from ACGIH (TLV) [United States] TWA: 2 CEIL: 2 (mg/m3) from OSHA (PEL) [United States] CEIL: 2 (mg/m3) from NIOSHConsult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Odorless.

Taste: Alkaline. Bitter. (Strong.)

Molecular Weight: Not applicable.

Color: Clear Colorless.

pH (1% soln/water): Basic.

Boiling Point: 140°C (284°F)

Melting Point: 12°C (53.6°F)

Critical Temperature: Not available.

Specific Gravity: 1.53 (Water = 1)

Vapor Pressure: The highest known value is 2.3 kPa (@ 20°C) (Water).

Vapor Density: The highest known value is 0.62 (Air = 1) (Water).

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Easily soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Excess heat, incompatible materials, water/moisture

Incompatibility with various substances:
Reactive with oxidizing agents, reducing agents, metals, acids, alkalis. Slightly reactive with water

Corrosivity:
Extremely corrosive in presence of aluminum, brass. Corrosive in presence of copper, of stainless steel(304), of stainless steel(316). Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Hygroscopic. Much heat is evolved when solid material is dissolved in water. Therefore cold water and caution must be used for this process. Generates considerable heat when a sodium hydroxide solution is mixed with an acid Sodium hydroxide solution and octanol + diborane during a work-up of a reaction mixture of oxime and diborane in tetrahyrofuran is very exothermic, a mild explosion being noted on one occassion. Reactive with water, acids (mineral, non-oxidizing, e.g. hydrochloric, hydrofluoric acid, muriatic acid, phosphoric), acids (mineral, oxidizing e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), acids (organic e.g. acetic acid, benzoic acid, formic acid, methanoic acid, oxalic acid), aldehydes (e.g. acetaldehyde, acrolein, chloral hydrate, foraldehyde), carbamates (e.g. carbanolate, carbofuran), esters (e.g. butyl acetate, ethyl acetate, propyl formate), halogenated organics (dibromoethane, hexachlorobenzene, methyl chloride, trichloroethylene), isocyanates (e.g. methyl isocyanate), ketones (acetone, acetophenone, MEK, MIBK), acid chlorides, strong bases, strong oxidizing agents, strong reducing agents, flammable liquids, powdered metals and metals (i.e aluminum, tin, zinc, hafnium, raney nickel), metals (alkali and alkaline e.g. cesium, potassium, sodium), metal compounds (toxic e.g. berylium, lead acetate, nickel carbonyl, tetraethyl lead), mitrides (e.g. potassium nitride, sodium nitride), nitriles (e.g. acetonitrile, methyl cyanide), nitro compounds (organic e.g. nitrobenzene, nitromethane), acetic anhydride, hydroquinone, chlorohydrin, chlorosulfonic acid, ethylene cyanohydrin, glyoxal, hydrosulfuric acid, oleum, propiolactone, acylonitrile, phorosous pentoxide, chloroethanol, chloroform-methanol, tetrahydroborate, cyanogen azide, 1,2,4,5 tetrachlorobenzene, cinnamaldehyde. Reacts with formaldehyde hydroxide to yield formic acid, and hydrogen. (Sodium hydroxide)

Special Remarks on Corrosivity: Very caustic to aluminum and other metals in presence of moisture.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
LD50: Not available. LC50: Not available.

Chronic Effects on Humans: Not available.

Other Toxic Effects on Humans:
Extremely hazardous in case of inhalation (lung corrosive). Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (corrosive), of ingestion, .

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Investigation as a mutagen (cytogenetic analysis), but no data available. (Sodium hydroxide)

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects: Skin: May be harmful if absorbed through skin. Causes severe skin irritation and burns. May cause deep penetrating ulcers of the skin. Eyes: Causes severe eye irritation and burns. May cause chemical conjunctivitis and corneal damage. Inhalation: Harmful if inhaled. Causes severe irritation of the respiratory tract and mucous membranes with coughing, burns, breathing difficulty, and possible coma. Irritation may lead the chemical pneumonitis and pulmonary edema. Causes chemical burns to the respiratory tract and mucous membranes. Ingestion: May be fatal if swallowed. May cause severe and permanent damage to the digestive tract. Causes

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Sodium hydroxide, solution (Sodium hydroxide) UNNA: UN1824 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Illinois toxic substances disclosure to employee act: Sodium hydroxide Illinois chemical safety act: Sodium hydroxide New York release reporting list: Sodium hydroxide Rhode Island RTK hazardous substances: Sodium hydroxide Pennsylvania RTK: Sodium hydroxide Minnesota: Sodium hydroxide Massachusetts RTK: Sodium hydroxide New Jersey: Sodium hydroxide Louisiana spill reporting: Sodium hydroxide TSCA 8(b) inventory: Sodium hydroxide; Water CERCLA: Hazardous substances.: Sodium hydroxide: 1000 lbs. (453.6 kg);

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):

CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

DSCL (EEC):

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE - EYE AND MUCOUS MEMBRANE IRRITANT - EFFECTS CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION HAZARD

NFPA 704 (Section 16)

High fire hazard. Keep away from heat, spark, open flame, and other ignition sources.

If ingested, do NOT induce vomiting, as this may cause chemical pneumonia (fluid in the lungs). Contact may cause eye, skin and mucous membrane irritation. Harmful if absorbed through the skin. Avoid prolonged breathing of vapors or mists. Inhalation may cause irritation, anesthetic effects (dizziness, nausea, headache, intoxication), and respiratory system effects.

Long-term exposure may cause effects to specific organs, such as to the liver, kidneys, blood, nervous system, and skin. Contains benzene, which can cause blood disease, including anemia and leukemia.

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800)424-9300**
COMPANY CONTACT (business hours): Corporate Safety (732)750-6000
MSDS (Environment, Health, Safety) Internet Website www.hess.com

SYNONYMS: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS *

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Gasoline (86290-81-5)	100
Benzene (71-43-2)	0.1 - 4.9 (0.1 - 1.3 reformulated gasoline)
n-Butane (106-97-8)	< 10
Ethyl Alcohol (Ethanol) (64-17-5)	0 - 10
Ethyl benzene (100-41-4)	< 3
n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Tertiary-amyl methyl ether (TAME) (994-05-8)	0 to 17.2
Toluene (108-88-3)	1 - 25
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 - 15

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol or MTBE and/or TAME).

Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

3. HAZARDS IDENTIFICATION

EYES
Moderate irritant. Contact with liquid or vapor may cause irritation.

SKIN
Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed repeatedly.

INGESTION
The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION
Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS and CARCINOGENICITY
Contains benzene, a regulated human carcinogen. Benzene has the potential to cause anemia and other blood diseases, including leukemia, after repeated and prolonged exposure. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with systemic toxicity. See also Section 11 - Toxicological Information.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Irritation from skin exposure may aggravate existing open wounds, skin disorders, and dermatitis (rash). Chronic respiratory disease, liver or kidney dysfunction, or pre-existing central nervous system disorders may be aggravated by exposure.

4. FIRST AID MEASURES

EYES
In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

SKIN
Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops.

INGESTION

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

INHALATION
Remove person to fresh air. If person is not breathing, ensure an open airway and provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES:

FLASH POINT:	-45 ^{o}F (-43°C)
AUTOIGNITION TEMPERATURE:	highly variable; > 530 ^{o}F (>280 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	1A (flammable liquid)
LOWER EXPLOSIVE LIMIT (%):	1.4%
UPPER EXPLOSIVE LIMIT (%):	7.6%

FIRE AND EXPLOSION HAZARDS
Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or Halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

During certain times of the year and/or in certain geographical locations, gasoline may contain MTBE and/or TAME. Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration - refer to NFPA 11 “Low Expansion Foam - 1994 Edition.”

FIRE FIGHTING INSTRUCTIONS
Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for the NFPA 704 Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

7. HANDLING and STORAGE

HANDLING PRECAUTIONS

******USE ONLY AS A MOTOR FUEL******
******DO NOT SIPHON BY MOUTH******

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HYGIENIC PRACTICES

Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	STEL (ppm)	Exposure Limits Note
Gasoline (86290-81-5)	ACGIH	300	500	A3
Benzene (71-43-2)	OSHA	1	5	Carcinogen
	ACGIH	0.5	2.5	A1, skin
	USCG	1	5	
n-Butane (106-97-8)	ACGIH	1000	--	Aliphatic Hydrocarbon Gases Alkane (C1-C4)
Ethyl Alcohol (ethanol) (64-17-5)	OSHA	1000	--	
	ACGIH	1000	--	A4
Ethyl benzene (100-41-4)	OSHA	100	--	
	ACGIH	100	125	A3
n-Hexane (110-54-3)	OSHA	500	--	
	ACGIH	50	--	Skin
Methyl-tertiary butyl ether [MTBE] (1634-04-4)	ACGIH	50		A3
Tertiary-amyl methyl ether [TAME] (994-05-8)				None established
Toluene (108-88-3)	OSHA	200		Ceiling: 300 ppm; Peak: 500 ppm (10 min.)
	ACGIH	20	--	A4
1,2,4- Trimethylbenzene (95-63-6)	ACGIH	25	--	
Xylene, mixed isomers (1330-20-7)	OSHA	100	--	
	ACGIH	100	150	A4

ENGINEERING CONTROLS

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

EYE/FACE PROTECTION

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION

Gloves constructed of nitrile or neoprene are recommended. Chemical protective clothing such as that made of of E.I. DuPont Tychem ®, products or equivalent is recommended based on degree of exposure.

Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION

A NIOSH-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Refer to OSHA 29 CFR 1910.134, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection and limitations.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

A translucent, straw-colored or light yellow liquid

ODOR
A strong, characteristic aromatic hydrocarbon odor. Oxygenated gasoline with MTBE and/or TAME may have a sweet, ether-like odor and is detectable at a lower concentration than non-oxygenated gasoline.

ODOR THRESHOLD

	Odor Detection	Odor Recognition
Non-oxygenated gasoline:	0.5 - 0.6 ppm	0.8 - 1.1 ppm
Gasoline with 15% MTBE:	0.2 - 0.3 ppm	0.4 - 0.7 ppm
Gasoline with 15% TAME:	0.1 ppm	0.2 ppm

BASIC PHYSICAL PROPERTIES

BOILING RANGE:	85 to 437 ^{o}F (39 to 200 ^{o}C)
VAPOR PRESSURE:	6.4 - 15 RVP @ 100 ^{o}F (38 ^{o}C) (275-475 mm Hg @ 68 ^{o}F (20 ^{o}C)
VAPOR DENSITY (air = 1):	AP 3 to 4
SPECIFIC GRAVITY (H_2O = 1):	0.70 – 0.78
EVAPORATION RATE:	10-11 (n-butyl acetate = 1)
PERCENT VOLATILES:	100 %
SOLUBILITY (H_2O):	Non-oxygenated gasoline - negligible (< 0.1% @ 77 ^{o}F). Gasoline with 15% MTBE - slight (0.1 - 3% @ 77 ^{o}F); ethanol is readily soluble in water

10. STABILITY and REACTIVITY)

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID
Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources

INCOMPATIBLE MATERIALS
Keep away from strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS
Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY
Acute Dermal LD50 (rabbits): > 5 ml/kg
Acute Oral LD50 (rat): 18.75 ml/kg
Primary dermal irritation (rabbits): slightly irritating
Draize eye irritation (rabbits): non-irritating
Guinea pig sensitization: negative

CHRONIC EFFECTS AND CARCINOGENICITY
Carcinogenicity: OSHA: NO IARC: YES - 2B NTP: NO ACGIH: YES (A3)

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

MATERIAL SAFETY DATA SHEET

Gasoline, All Grades **MSDS No. 9950**

This product may contain methyl tertiary butyl ether (MTBE): animal and human health effects studies indicate that MTBE may cause eye, skin, and respiratory tract irritation, central nervous system depression and neurotoxicity. MTBE is classified as an animal carcinogen (A3) by the ACGIH.

12. ECOLOGICAL INFORMATION

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations. If released, oxygenates such as ethers and alcohols will be expected to exhibit fairly high mobility in soil, and therefore may leach into groundwater. The API (www.api.org) provides a number of useful references addressing petroleum and oxygenate contamination of groundwater.

13. DISPOSAL CONSIDERATIONS

Consult federal, state and local waste regulations to determine appropriate disposal options.

14. TRANSPORTATION INFORMATION

DOT PROPER SHIPPING NAME:	Gasoline
DOT HAZARD CLASS and PACKING GROUP:	3, PG II
DOT IDENTIFICATION NUMBER:	UN 1203
DOT SHIPPING LABEL:	FLAMMABLE LIQUID

PLACARD:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)

The CERCLA definition of hazardous substances contains a “petroleum exclusion” clause which exempts crude oil, refined, and unrefined petroleum products and any indigenous components of such. However, other federal reporting requirements (e.g., SARA Section 304 as well as the Clean Water Act if the spill occurs on navigable waters) may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
X	X	X	--	--

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION WT. PERCENT
Benzene (71-43-2)	0.1 to 4.9 (0.1 to 1.3 for reformulated gasoline)
Ethyl benzene (100-41-4)	< 3

n-Hexane (110-54-3)	0.5 to 4
Methyl-tertiary butyl ether (MTBE) (1634-04-4)	0 to 15.0
Toluene (108-88-3)	1 to 15
1,2,4- Trimethylbenzene (95-63-6)	< 6
Xylene, mixed isomers (1330-20-7)	1 to 15

US EPA guidance documents (www.epa.gov/tri) for reporting Persistent Bioaccumulating Toxics (PBTs) indicate this product may contain the following deminimis levels of toxic chemicals subject to Section 313 reporting:

INGREDIENT NAME (CAS NUMBER)	CONCENTRATION - Parts per million (ppm) by weight
Polycyclic aromatic compounds (PACs)	17
Benzo (g,h,i) perylene (191-24-2)	2.55
Lead (7439-92-1)	0.079

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS

This product contains the following chemicals that are included on the Proposition 65 "List of Chemicals" required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

INGREDIENT NAME (CAS NUMBER)	Date Listed
Benzene	2/27/1987
Ethyl benzene	6/11/2004
Toluene	1/1/1991

CANADIAN REGULATORY INFORMATION (WHMIS)

Class B, Division 2 (Flammable Liquid)
Class D, Division 2A (Very toxic by other means) and Class D, Division 2B (Toxic by other means)

16. OTHER INFORMATION

NFPA® HAZARD RATING	HEALTH:	1	Slight
	FIRE:	3	Serious
	REACTIVITY:	0	Minimal
HMIS® HAZARD RATING	HEALTH:	1 *	Slight
	FIRE:	3	Serious
	PHYSICAL:	0	Minimal
			* CHRONIC

SUPERSEDES MSDS DATED: 07/01/06

ABBREVIATIONS:

AP = Approximately	< = Less than	> = Greater than
N/A = Not Applicable	N/D = Not Determined	ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
AIHA	American Industrial Hygiene Association	DOT	U.S. Department of Transportation [General Info: (800)467-4922]
ANSI	American National Standards Institute (212)642-4900	EPA	U.S. Environmental Protection Agency
API	American Petroleum Institute (202)682-8000	HMIS	Hazardous Materials Information System

IARC	International Agency For Research On Cancer	REL	Recommended Exposure Limit (NIOSH)
MSHA	Mine Safety and Health Administration	SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
NFPA	National Fire Protection Association (617)770-3000	SCBA	Self-Contained Breathing Apparatus
NIOSH	National Institute of Occupational Safety and Health	SPCC	Spill Prevention, Control, and Countermeasures
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)	STEL	Short-Term Exposure Limit (generally 15 minutes)
NTP	National Toxicology Program	TLV	Threshold Limit Value (ACGIH)
OPA	Oil Pollution Act of 1990	TSCA	Toxic Substances Control Act
OSHA	U.S. Occupational Safety & Health Administration	TWA	Time Weighted Average (8 hr.)
PEL	Permissible Exposure Limit (OSHA)	WEEL	Workplace Environmental Exposure Level (AIHA)
RCRA	Resource Conservation and Recovery Act	WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

MATERIAL SAFETY DATA SHEET

FILE NO. 9636, 9637, 9638, 9616, 11360
NAME OF PRODUCT: AW Hydraulic Oil ISO 46 **MSDS DATE:** December, 2009

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: AW Hydraulic Oil ISO 46
SYNONYMS: hydraulic fluid
PRODUCT CODES: 9616,9636,9637,9637Tray,9638,11360, CG46AWBlue

MANUFACTURER: CGF INC
DIVISION: N/A
ADDRESS: 317 Peoples Avenue Rockford, IL 61104 USA

EMERGENCY PHONE: 800/424-9300
CHEMTREC PHONE: 800/424-9300
OTHER CALLS: 815-967-4400
FAX PHONE: 815-967-4404

PRODUCT USE: Hydraulic Fluid
PREPARED BY: Irena Larson/Denise Brauer

SECTION 1 NOTES:

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT: **Petroleum base oils, additive package.**

CAS NO.	% WT	% VOL	SARA 313 REPORTABLE
64741-88-4	75-85		None
64742-01-4	15-25		None
Proprietary Additive(s)	0.5-1.5		None

SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This material is not considered hazardous according to OSHA criteria.

ROUTES OF ENTRY: Skin contact or inhalation.

POTENTIAL HEALTH EFFECTS

EYES: Contact may cause mild eye irritation including stinging, watering, and redness.

SKIN: Contact may cause mild skin irritation including redness and a burning sensation. Prolonged or repeated contact can defat the skin, causing drying and cracking of the skin and possibly dermatitis (inflammation). No harmful effects from skin absorption are expected.

INGESTION: No harmful effects expected from ingestion.

INHALATION: No information available on acute toxicity.

ACUTE HEALTH HAZARDS: No

CHRONIC HEALTH HAZARDS: No

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: Skin disorders may be aggravated by exposure.

CARCINOGENICITY

OSHA: None **ACGIH: None** **NTP:** None **IARC: None**
OTHER:

SECTION 3 NOTES:

SECTION 4: FIRST AID MEASURES

EYES: If irritation or redness develops, flush eyes with clean water. If symptoms persist, seek medical attention.

SKIN: Remove contaminated shoes and clothing and cleanse affected area(s) thoroughly by washing with a mild soap and water or a waterless hand cleaner. If irritation persists, seek medical attention.

INGESTION: First aid is not normally required; however, if swallowed and symptoms develop, seek medical attention.

INHALATION: If respiratory symptoms develop, move victim away from source of exposure and into fresh air. If symptoms persist, seek medical attention.

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: High-pressure hydrocarbon injection injuries may produce substantial necrosis of underlying tissue despite an innocuous appearing wound. Often these injuries require emergency surgical debridement and all injuries should be evaluated by a specialist in order to assess the extent of injury.

Acute aspirations of large amounts of mineral oil-laden material may produce serious aspiration pneumonia. Patients who aspirate these oils should be followed for the development of long-term sequelae. Inhalation exposure to oil mists below current workplace exposure limits is unlikely to cause pulmonary abnormalities.

SECTION 4 NOTES:

SECTION 5: FIRE-FIGHTING MEASURES

EXTINGUISHING MEDIA: Dry chemical, carbon dioxide, foam, or water spray is recommended.

SPECIAL FIRE FIGHTING PROCEDURES:
Water or foam may cause frothing of materials heated above 212 F. Carbon dioxide can displace oxygen. Use caution when applying dioxide in confined spaces.

SPECIAL PROTECTIVE EQUIPMENT: For fires in enclosed areas, fire fighters muct use self-contained breathing apparatus.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This material may burn, but will not ignite readily. If container is not properly cooled, it can rupture in the heat of fire.

HAZARDOUS DECOMPOSITION PRODUCTS: No data

Flash Point: C(F) : >210(410) (ASTM D-92)
Flammable Limits (approx. % vol. in air)- LEL: 0.9%, UEL: 7.0%
NFPA HAZARD ID: Health: 1, Flammability: 1, Reactivity: 0

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES:
Personal Precautions:
This material may burn, but will not ignite readily. Keep all sources of ignition away from spill/release. The use of explosion-proof electrical equipment is recommended. Stay upwind and away from spill/release. Notify persons downwind of the spill/release, isolate immediate hazard area and keep unauthorized personnel out. Wear appropriate protective equipment, including respiratory protection, as conditions warrant.
Environmental Precautions: Stop spill/release if it can be done with minimal risk. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Contact appropriate agency for spills into or upon navigable waters that cause a sheen or discoloration on the water surface.

Methods for Containment and Clean Up:
Notify fire authorities and appropriate regulatory authorities. Immediate cleanup of any spill is recommended. Dike far ahead of spill for later recovery or disposal. Spilled material may be absorbed into an appropriate absorbent material.

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE:
Wash thoroughly after handling. Use good personal hygiene practices and wear appropriate personal protective equipment. High pressure injection of hydrocarbon fuels, hydraulic oils or greases under the skin may have serious consequences even though no symptoms or injury may be apparent. This can happen accidentally when using high pressure equipment such as high pressure grease guns, fuel injection

apparatus or from pinhole leaks in tubing of high pressure hydraulic oil equipment. Do not enter confined spaces such as tanks or pits without following proper entry procedures. Do not wear contaminated clothing or shoes. "Empty" containers retain residue and may be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury or death. "Empty" drums should be completely drained, properly bunged, and promptly shipped to the supplier or a drum reconditioner. All containers should be disposed of in an environmentally safe manner and in accordance with governmental regulations. Use and store this material in cool, dry, well-ventilated areas away from heat and all sources of ignition. Keep container(s) tightly closed. Store only in approved containers. Keep away from any incompatible material. Protect container(s) against physical damage.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Componet	**ACGIH**	**OSHA**
Lubricant Base Oil-Petroleum	TWA: 5mg/m^3	TWA: 5mg/m^3
	STEL: 10mg/m^3	as Oil mist, if generated
	As oil mist, if generated	

ENGINEERING CONTROLS: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure limits, additional engineering controls may be required.

RESPIRATORY PROTECTION: Where there is potential for airborne exposure above the exposure limit a NIOSH certified air purifying respirator equipped with R or P95 filters may be used. A respiratory protection program that meets or is equivalent to OSHA 29 CFR 1910.134 and ANSI Z88.2 should be followed whenever workplace conditions warrant a respirator's use. Air purifying respirators provide limited protection and cannot be used in atmospheres that exceed the maximum use concentration (MUC) as directed by regulation or the manufacturer's instructions, in oxygen deficient (less than 19.5 percent oxygen) situations, or other conditions that are immediately dangerous to life and health (IDLH).

EYE PROTECTION: The use of eye protection that meets or exceeds ANSI Z.87.1 is recommended to protect against potential eye contact, irritation, or injury. Depending on conditions of use, a face shield may be necessary.

SKIN PROTECTION: The use of gloves impervious to the specific material handled is advised to prevent skin contact. Users should check with manufacturers to confirm the performance of their products. Suggested protective materials: Nitrile

SECTION 8 NOTES: State, local or other agencies or advisory groups may have established more stringent limits. Consult an industrial hygienist or similar professional, or your local agencies, for further information.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Clear Blue Liquid

ODOR: mild petroleum

PHYSICAL STATE: Liquid

pH AS SUPPLIED: Not applicable
pH (Other):
BOILING POINT: No data
F: >600
C: >316

FLASH POINT:
F: >410
C: >210
METHOD USED: (ASTM D-92)

AUTOIGNITION TEMPERATURE:
F: 671
C: 355

MELTING POINT: No data
F:
C:
FREEZING POINT: No data
F:

MATERIAL SAFETY DATA SHEET

FILE NO. 9636, 9637, 9638, 9616, 11360
NAME OF PRODUCT: AW Hydraulic Oil ISO 46 **MSDS DATE:** December, 2009

C:

VAPOR PRESSURE (mmHg): <1
@ 20 C :< 0.1

VAPOR DENSITY (AIR = 1): >2
@
F: 68
C: 20
SPECIFIC GRAVITY (H2O = 1): 0.87
@
F: 60
C: 15.6
EVAPORATION RATE: n/a

BASIS (=1):

SOLUBILITY IN WATER: not soluble

PERCENT SOLIDS BY WEIGHT: n/a

PERCENT VOLATILE: Negligible
BY WT/ BY VOL @
F: 68
C: 20
VOLATILE ORGANIC COMPOUNDS (VOC): no data

WITH WATER: LBS/GAL
WITHOUT WATER: LBS/GAL

MOLECULAR WEIGHT: no data
VISCOSITY:
200-300 SUS @ 100 Degree F
@ 40 C cST 47.25

SECTION 9 NOTES: Data represents typical values and are not intended to be specifications.

SECTION 10: STABILITY AND REACTIVITY

	STABLE	UNSTABLE
STABILITY:	**YES**	

CONDITIONS TO AVOID (STABILITY): Avoid excessive heat, formations of vapors or mists.

INCOMPATIBILITY (MATERIAL TO AVOID): Strong oxidizing agents

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: None under normal storage.

HAZARDOUS POLYMERIZATION: No

CONDITIONS TO AVOID (POLYMERIZATION): n/a

SECTION 10 NOTES:

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION:
Carcinogenicity: The petroleum base oils contained in this product have been highly refined by a variety of processes including solvent extraction, hydrotreating, and/or dewaxing to remove aromatics and improve performance characteristics. No components in this formulation have been identified as a carcinogen.

Component	Oral LD50	Dermal LD50	Inhalation LC50
Lubricant Base Oil	**>5g/kg**	**>2g/kg**	**No data**

SECTION 11 NOTES:

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: Ecotoxicological data have not been determined specifically for this product. Information given is based on knowledge of the components and the ecotoxicology of similar products.
Acute Toxicity: Poorly soluble mixture. May cause physical fouling of aquatic organisms. Expected to be practically non toxic: LL/EL/IL50 > 100 mg/l (to aquatic organisms) (LL/EL50 expressed as the nominal amount of product required to prepare aqueous test extract). Mineral oil is not expected to cause any chronic effects to aquatic organisms at concentrations less than 1 mg/l.
Mobility: Liquid under most environmental conditions. Floats on water. If it enters soil, it will adsorb to soil particles and will not be mobile.
Persistence/degradability: Expected to be not readily biodegradable. Major constituents are expected to be inherently biodegradable, but the product contains components that may persist in the environment.
Bioaccumulation : Contains components with the potential to bioaccumulate.
Other Adverse Effects: Product is a mixture of non-volatile components, which are not expected to be released to air in any significant quantities. Not expected to have ozone depletion potential, photochemical ozone creation potential or global warming potential

SECTION 12 NOTES:

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD:
Material Disposal: Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. Do not dispose into the environment, in drains or in water courses.
Container Disposal: Dispose in accordance with prevailing regulations, preferably to a recognized collector or contractor. The competence of the collector or contractor should be established beforehand.
Local Legislation: Disposal should be in accordance with applicable regional, national, and local laws and regulations.

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION: Not regulated
PROPER SHIPPING NAME:
HAZARD CLASS:
ID NUMBER:
PACKING GROUP:
LABEL STATEMENT:

WATER TRANSPORTATION: Not regulated
PROPER SHIPPING NAME:
HAZARD CLASS:
ID NUMBER:
PACKING GROUP:
LABEL STATEMENTS:

AIR TRANSPORTATION: Not regulated
PROPER SHIPPING NAME:
HAZARD CLASS:
ID NUMBER:
PACKING GROUP:
LABEL STATEMENTS:

OTHER AGENCIES:

SECTION 14 NOTES:

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TSCA (TOXIC SUBSTANCE CONTROL ACT): All components of this formulation are listed on the US EPA-TSCA inventory or not regulated under TSCA.

EU Labeling: Product is not dangerous as defined by the European Union Dangerous Substances/Preparations Directives. EU labeling is not required.

Governmental Inventory Status: All components comply with TSCA, EINECS/ELINCS, AICS, METI, DSL, KOREA, and PHILIPPINES.

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): This material does not contain any chemicals subject to the reporting requirements of SARA 302 and 40 CFR 372.

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT): This product contains no"EXTREMELY HAZARDOUS SUBSTANCES".

311/312 HAZARD CATEGORIES: None
Acute Health: No
Chronic Health: No
Fire Hazard: No
Pressure Hazard: No
Reactive Hazard: No

313 REPORTABLE INGREDIENTS: This material does not contain any chemicals subject to the reporting requirements of SARA 313 and 40 CFR 372.

STATE REGULATIONS: This material does not contain any chemicals with CERCLA Reportable Quantities.

California Proposition 65:
This material does not contain any chemicals which are known to the State of California to cause cancer, birth defects or other reproductive harm at concentrations that trigger the warning requirements of California Proposition 65.

INTERNATIONAL REGULATIONS:

Canadian Regulations:
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class
None

SECTION 15 NOTES:

SECTION 16: OTHER INFORMATION

OTHER INFORMATION:

PREPARATION INFORMATION: Issue Date: August 2009 Rev. #1

DISCLAIMER:
The information presented herein has been compiled from sources considered to be dependable and accurate to the best of Cutting & Grinding Fluids Inc., knowledge. However, CGF INC., makes no warranty whatsoever expressed or implied of merchantability or fitness for the particular purpose, regarding the accuracy of such data or the results to be obtained from the use thereof. Cutting & Grinding Fluids, Inc. assumes no responsibility for the injury to recipient or to the third persons or for any damage to any property and recipient assumes all such risks.

Safety Data Sheet

Material Name: Diesel Fuel, All Types

SDS No. 9909
US GHS

Synonyms: Ultra Low Sulfur Diesel; Low Sulfur Diesel; No. 2 Diesel; Motor Vehicle Diesel Fuel; Non-Road Diesel Fuel; Locomotive/Marine Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Skin Corrosion/Irritation – Category 2
Germ Cell Mutagenicity – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)

Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Causes skin irritation.
Suspected of causing genetic defects.
Suspected of causing cancer.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.

Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid breathing fume/mist/vapours/spray.

Response

In case of fire: Use water spray, fog or foam to extinguish.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a poison center/doctor if you feel unwell.
If swallowed: Immediately call a poison center or doctor. Do NOT induce vomiting.
IF exposed or concerned: Get medical advice/attention.

Storage

Store in a well-ventilated place. Keep cool.
Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-34-6	Fuels, diesel, no. 2	100
91-20-3	Naphthalene	<0.1

A complex mixture of hydrocarbons with carbon numbers in the range C9 and higher.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops. Thermal burns require immediate medical attention depending on the severity and the area of the body burned.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, and other gaseous agents.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Safety Data Sheet

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers.

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: 10 ppm TWA
15 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 10 ppm TWA; 50 mg/m3 TWA
NIOSH: 10 ppm TWA; 50 mg/m3 TWA
15 ppm STEL; 75 mg/m3 STEL

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Clear, straw-yellow.	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	320 to 690 °F (160 to 366 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	0.83-0.876 @ 60°F (16°C)
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Percent Volatile:	100%	**Octanol/H2O Coeff.:**	ND
Flash Point:	>125 °F (>52 °C) minimum	**Flash Point Method:**	PMCC
Upper Flammability Limit (UFL):	7.5	**Lower Flammability Limit (LFL):**	0.6
Burning Rate:	ND	**Auto Ignition:**	494°F (257°C)

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This material has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

B: Component Carcinogenicity

Fuels, diesel, no. 2 (68476-34-6)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuels, diesel, no. 2 (68476-34-6)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]	
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]	

96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

DOT Information

Shipping Name: Diesel Fuel

NA #: 1993 **Hazard Class:** 3 **Packing Group:** III

Placard:

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Naphthalene (91-20-3)

CERCLA: 100 lb final RQ; 45.4 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health	Chronic Health	Fire	Sudden Release of Pressure	Reactive
X	X	X	--	--

Safety Data Sheet

Material Name: Diesel Fuel, All Types **SDS No. 9909**

SARA SECTION 313 - SUPPLIER NOTIFICATION

This product may contain listed chemicals below the de minimis levels which therefore are not subject to the supplier notification requirements of Section 313 of the Emergency Planning and Community Right- To-Know Act (EPCRA) of 1986 and of 40 CFR 372. If you may be required to report releases of chemicals listed in 40 CFR 372.28, you may contact Hess Corporate Safety if you require additional information regarding this product.

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Fuels, diesel, no. 2	68476-34-6	No	No	No	Yes	No	No
Naphthalene	91-20-3	Yes	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

Component Analysis - WHMIS IDL

No components are listed in the WHMIS IDL.

Additional Regulatory Information

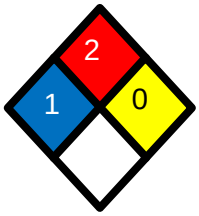
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Fuels, diesel, no. 2	68476-34-6	Yes	DSL	EINECS
Naphthalene	91-20-3	Yes	DSL	EINECS

* * * Section 16 - Other Information * * *

NFPA® Hazard Rating

Health	1
Fire	2
Reactivity	0



HMIS® Hazard Rating

Health	1*	Slight
Fire	2	Moderate
Physical	0	Minimal
		*Chronic

Safety Data Sheet

Material Name: Diesel Fuel, All Types **SDS No. 9909**

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

MATERIAL SAFETY DATA SHEET

1. Product and Company Identification

Material name SUPER GEL-X®

Version # 12

Revision date 21-February-2009

Chemical description Smectite Clay

Manufacturer

CETCO
Drilling Products Group
2870 Forbs Avenue
Hoffman Estates, IL 60192 US
safetydata@amcol.com
http://www.cetco.com/
General Information (800) 527-9948
CHEMTREC® (800) 424-9300

2. Hazards Identification

Emergency overview Material can be slippery when wet

Potential health effects

Routes of exposure Inhalation.

Eyes Dust or powder may irritate eye tissue.

Skin Non-irritating to the skin.

Inhalation Repeated or prolonged inhalation may cause toxic effects. For additional information on inhalation hazards, see Section 11 of this safety data sheet.

Ingestion No significant adverse effects are expected upon ingestion of the product.

Target organs Lungs.

Chronic effects This product has the potential for generation of respirable dust during handling and use. Dust may contain respirable crystalline silica. Overexposure to dust may result in pneumocononiosis, a respiratory disease caused by inhalation of mineral dust, which can lead to fibrotic changes to the lung tissue, or silicosis, a respiratory disease caused by inhalation of silica dust, which can lead to inflammation and fibrosis of the lung tissue. Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

3. Composition / Information on Ingredients

Components	CAS #	Percent
BENTONITE	1302-78-9	60 - 100
Non-hazardous and other components below reportable levels		> 0.0001

Composition comments Bentonite contains naturally occurring crystalline silica (not listed in Annex I of Directive 67/548/EEC) in quantities less than 6%. Occupational Exposure Limits for impurities are listed in Section 8.

4. First Aid Measures

First aid procedures

Eye contact Flush eyes immediately with large amounts of water. If irritation persists get medical attention.

Skin contact No special measures required. Get medical attention if irritation develops or persists.

Inhalation Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get medical attention, if needed.

Ingestion No special measures required. If ingestion of a large amount does occur, seek medical attention.

Notes to physician Provide general supportive measures and treat symptomatically.

5. Fire Fighting Measures

Flammable properties This material will not burn.

Extinguishing media

Suitable extinguishing media Use any media suitable for the surrounding fires. Dry chemical, CO2, water spray or regular foam.

Protection of firefighters

Protective equipment for firefighters Material can be slippery when wet

Special protective equipment for fire-fighters Material can be slippery when wet

Explosion data

Sensitivity to mechanical impact Not available.

Sensitivity to static discharge Not available.

Hazardous combustion products None known.

6. Accidental Release Measures

Personal precautions Material can be slippery when wet. Wear a dust mask if dust is generated above exposure limits.

Environmental precautions No special environmental precautions required.

Methods for cleaning up Avoid the generation of dusts during clean-up. Collect dust or particulates using a vacuum cleaner with a HEPA filter. Reduce airborne dust and prevent scattering by moistening with water.

7. Handling and Storage

Handling Keep formation of airborne dusts to a minimum. Provide appropriate exhaust ventilation at places where dust is formed. In case of insufficient ventilation, wear suitable respiratory equipment.

Storage Guard against dust accumulation of this material. No special storage conditions required. No special restrictions on storage with other products.

8. Exposure Controls / Personal Protection

Occupational exposure limits

ACGIH

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	10 mg/m3	Inhalable particles.
		3 mg/m3	Respirable particles.
QUARTZ (14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

Canada - Alberta

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	3 mg/m3	Respirable particles.
		10 mg/m3	Total particulate.
QUARTZ (14808-60-7)	TWA	0.1 mg/m3	Respirable particles.

Canada - British Columbia

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	3 mg/m3	Respirable fraction.
		10 mg/m3	Total dust.
QUARTZ (14808-60-7)	TWA	0.025 mg/m3	Respirable fraction.

Canada - Ontario

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	10 mg/m3	Inhalable particulate.
		3 mg/m3	Respirable particles.
QUARTZ (14808-60-7)	TWA	0.1 mg/m3	Respirable fraction.

Canada - Quebec

Impurities	Type	Value	Form
INERT OR NUISANCE DUST (SEQ250)	TWA	10 mg/m3	Total dust.
QUARTZ (14808-60-7)	TWA	0.1 mg/m3	Respirable dust.

Exposure guidelines Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

Engineering controls If material is ground, cut, or used in any operation which may generate dusts, use appropriate local exhaust ventilation to keep exposures below the recommended exposure limits. If engineering measures are not sufficient to maintain concentrations of dust particulates below the OEL, suitable respiratory protection must be worn.

Personal protective equipment

Eye / face protection Wear dust goggles. Eye wash fountain is recommended.

Skin protection No special protective equipment required.

Respiratory protection Use a particulate filter respirator for particulate concentrations exceeding the Occupational Exposure Limit.

General hygeine considerations Use good industrial hygiene practices in handling this material.

9. Physical & Chemical Properties

Appearance Not available.

Color Not available.

Odor None.

Odor threshold Not available.

Physical state Solid.

Form Granular. Powder. Pellets. or Chips.

pH 7 - 11

Melting point Not available.

Freezing point Not available.

Boiling point Not available.

Flash point Non-flammable

Evaporation rate Not available.

Flammability Not available.

Flammability limits in air, upper, % by volume Not available.

Flammability limits in air, lower, % by volume Non-explosive

Vapor pressure Not available.

Vapor density Not available.

Specific gravity 2.5497 estimated

Relative density Not available.

Solubility (water) Negligible

Partition coefficient (n-octanol/water) Not available.

Auto-ignition temperature Not available.

Decomposition temperature Not available.

VOC 0 % estimated

10. Chemical Stability & Reactivity Information

Chemical stability Stable at normal conditions.

Conditions to avoid None known.

Incompatible materials None known.

Hazardous decomposition products None known.

Possibility of hazardous reactions Will not occur.

11. Toxicological Information

Chronic effects

In 1997, IARC (the International Agency for Research on Cancer) concluded that crystalline silica inhaled from occupational sources can cause lung cancer in humans. However in making the overall evaluation, IARC noted that "carcinogenicity was not detected in all industrial circumstances studied. Carcinogenicity may be dependent on inherent characteristics of the crystalline silica or on external factors affecting its biological activity or distribution of its polymorphs." (IARC Monographs on the evaluation of the carcinogenic risks of chemicals to humans, Silica, silicates dust and organic fibres, 1997, Vol. 68, IARC, Lyon, France.)

In June 2003, SCOEL (the EU Scientific Committee on Occupational Exposure Limits) concluded that the main effect in humans of the inhalation of respirable crystalline silica dust is silicosis. "There is sufficient information to conclude that the relative risk of lung cancer is increased in persons with silicosis (and, apparently, not in employees without silicosis exposed to silica dust in quarries and in the ceramic industry). Therefore, preventing the onset of silicosis will also reduce the cancer risk..." (SCOEL SUM Doc 94-final, June 2003)

According to the current state of the art, worker protection against silicosis can be consistently assured by respecting the existing regulatory occupational exposure limits. Occupational exposure to nuisance dust (total and respirable) and respirable crystalline silica should be monitored and controlled.

Carcinogenicity

IARC Monographs on Occupational Exposures to Chemical Agents: Overall evaluation

QUARTZ (14808-60-7)	1 Human carcinogen.

12. Ecological Information

Ecotoxicological data

Product	Test Results
SUPER GEL-X®	LC50 Fish: 19005 mg/l 96.00 Hours estimated
Components	**Test Results**
BENTONITE (1302-78-9)	LC50 Rainbow trout,donaldson trout (Oncorhynchus mykiss): 19000 mg/l 96.00 Hours

* Estimates for product may be based on additional component data not shown.

Ecotoxicity This material is not expected to be harmful to aquatic life.

Environmental effects Based on the physical properties of this product, significant environmental persistence and bioaccumulation would not be expected.

Persistence and degradability Not available.

13. Disposal Considerations

Disposal instructions Dispose in accordance with all applicable regulations. Material should be recycled if possible.

14. Transport Information

TDG

Not regulated as dangerous goods.

15. Regulatory Information

WHMIS classification D2A - Other Toxic Effects-VERY TOXIC

WHMIS labeling

WHMIS status Controlled

Inventory status

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of New and Existing Chemicals (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

16. Other Information

Recommended restrictions

Workers (and your customers or users in the case of resale) should be informed of the potential presence of respirable dust and respirable crystalline silica as well as their potential hazards. Appropriate training in the proper use and handling of this material should be provided as required under applicable regulations.

Further information

This safety datasheet only contains information relating to safety and does not replace any product information or product specification.

HMIS ratings

NFPA ratings

Health: 1
Flammability: 0
Instability: 0

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The manufacturer expressly does not make any representations, warranties, or guarantees as to its accuracy, reliability or completeness nor assumes any liability, for its use. It is the user's responsibility to verify the suitability and completeness of such information for each particular use.

Third party materials: Insofar as materials not manufactured or supplied by this manufacturer are used in conjunction with, or instead of this product, it is the responsibility of the customer to obtain, from the manufacturer or supplier, all technical data and other properties relating to these and other materials and to obtain all necessary information relating to them. No liability can be accepted in respect of the use of this product in conjunction with materials from another supplier. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Issue date

21-February-2009

Other information

CETCO is an AMCOL International company.

Canadian preparer address

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2870 Forbs Avenue
Hoffman Estates, IL 60192
United States
+1-847-851-1500
safetydata@amcol.com

Attachment C: Equipment Safety Cards

SAFETY NOW
NO OTHER WAY

AECOM

SAFETY CARD

CHAINSAW

Objective / Overview:

Available in a variety of types and capacities, chainsaws are one of the most powerful, yet dangerous cutting tools available. Working safely with a chain saw begins with training. Additional safety measures include proper training, good body mechanics and felling technique, well-maintained equipment, and protective clothing.

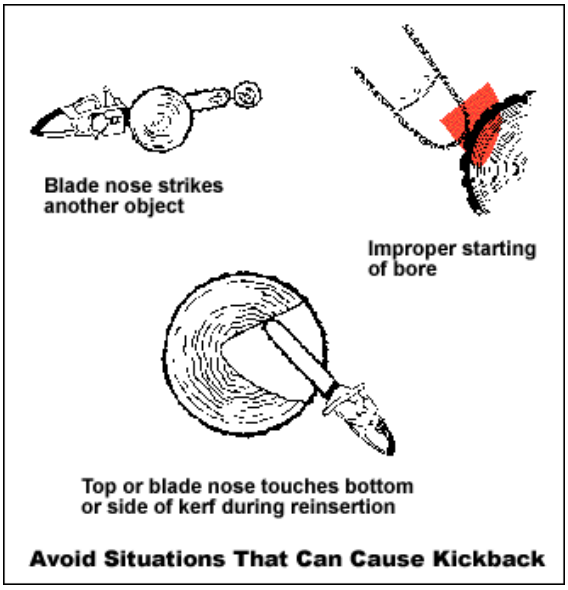
Safe Operating Guidelines:

A sharp chainsaw is safer than a dull one. Keep the saw clean, lubricated, and adjusted. Before starting work inspect and test the chain brake, chain catch, throttle lock, handles and guards, all nuts and bolts, spark arrestor, and muffler and air filter. The chain tension should be properly adjusted and the carburetor tuned. Never "drop start" the saw.

A chainsaw is not only dangerous to the operator but to those around him. Keep the saw close to the body. Bend from the knees, not the waist. Improper lifting techniques and poor posture contribute to injuries.

Potential Hazards:

- Kickback – Sudden and violent reverse movement of the saw
- Hand / arm vibration syndrome
- Flying / falling debris
- Severe cuts



Training Requirements:

- Review of Applicable SOPs (SH&E 720, *Clearing & Grubbing*)
- Demonstrated knowledge on the use of a chainsaw
- Review of manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Debris Shield
- Chainsaw Chaps
- Leather Gloves
- Hearing Protection

Other Safety Tips:

- Always avoid standing on the log and making cuts with the saw between your legs; always cut with the saw to the outside of your legs
- Determine where the tree/limb will fall prior to cutting. Always ensure that personnel and equipment are not in the path the falling tree/log, and that you have time to move away. If necessary, flag/or fence off the area to prevent entry.
- Always stand to one side of the limb you are to cut, never straddle it
- Always keep in mind where the chain will go if it breaks, never position yourself or other people in line with the chain
- Keep the chain out of the dirt, debris will fly, the teeth will be dulled and the chain life shortened

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CIRCULAR SAW

Objective / Overview:

Among professionals, the circular saw is probably the most commonly used powered saw and perhaps the most commonly abused. Familiarity should not breed carelessness. Safe measures include proper training, good body mechanics and felling technique, well-maintained equipment, and protective equipment. The circular saw is used in cutting wood products, (i.e., plywood, construction lumber, etc.).

Safe Operating Guidelines:

Use sharp blades. Dull blades cause binding, stalling and possible kickback. Use the correct blade for the application and check for proper operation before each cut. Check often to ensure that guards return to their normal position quickly. Never defeat the guard to expose the blade. Before starting a circular saw, be sure the power cord and extension cords are out of the blade path and are long enough to freely complete the cut. A sudden jerk or pulling on the cord can cause loss of control of the saw and a serious accident. For maximum control, hold the saw firmly with both hands after securing the work piece. Check frequently to be sure clamps remain secure. Avoid cutting small pieces that can't be properly secured and material on which the saw shoe can't properly rest. When you start the saw, allow the blade to reach full speed before contacting the work piece.

Potential Hazards:

- Kickback – Sudden and violent reverse movement of the saw
- Hearing loss
- Flying debris
- Severe cuts

Training Requirements:

- Review of Applicable SOPs (SH&E 610, *Hand and Power Tools* & SH&E 609, *Machine Guarding*)
- Demonstrated knowledge on the use of a circular saw
- Review and follow manufacturer's operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Leather Gloves
- Hearing Protection

Other Safety Tips:

- Circular saws are designed for right-hand operation; left-handed operation will demand more care to operate safely.
- Disconnect power supply before adjusting or changing the blade.
- Do not place hand under or in front of the shoe or guard of the saw when operating.
- Cut at the proper depth (¼ in.) below work surface (see picture).
- Circular saw must be double-insulated or protected by a GFCI.

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COMPRESSORS

Objective / Overview:

Compressors should be used with extreme caution in order to prevent personal injury. When using a compressor it's important to follow the manufacturer's instructions to avoid injuring someone or damaging your compressor. Allow only trained, authorized personnel to operate the compressor. Along with training, other safety measures include: proper maintenance of equipment and personal protective equipment.

Safe Operating Guidelines:

Follow manufactures recommended operating instructions, every compressor is not the same. Maintain adequate ventilation. Gas and Diesel powered generators emit carbon monoxide (CO). Never operate a fuel-powered compressor in an enclosed building without proper ventilation. Turn the compressor off to refuel. Gasoline and its vapors may ignite if they come into contact with hot components or an electrical spark, store fuel in a properly designed container in a secure location. Operators shall perform a pre-operational check of all air hoses, couplings, and connections to determine if leakage or other damage exists. Tag unsafe equipment and take out of service immediately. Decompress air from the compressor prior to removing any caps or air equipment attachments such as jackhammers, drills, etc. Keep oil and flammable material clear of air fittings and joints. Make sure connections are secure to avoid a hose coming loose during use. To avoid a shock, make sure that your hands are dry and you're standing in a dry place whenever you operate the compressor. Use only UL-listed, three-prong extension cords. Be sure the extension cord is the proper size (wire-gauge) to handle the electric load that will be plugged into it.

Potential Hazards:

- Burns from contact with the hot muffler or engine
- Shocks/electrocution
- Noise exposure
- Inhaling exhaust gases, CO
- Contact with pressurized air

Training Requirements:

- Review of Applicable SOPs (SH&E 611, *Electrical Safety-Portable Electrical Equipment* & SH&E 618, *Compressed Gasses*
- Demonstrated knowledge on the use of the compressor
- Review of manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Leather Gloves
- Hearing Protection
- Long Sleeve Shirt (e.g., to shield from burns, etc.)

Other Safety Tips:

- Have a Class A:B:C fire extinguisher readily available at all times.

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CORE DRILLING MACHINE

Objective / Overview:

Core drilling machines are used on all types of jobs. They can be electrical or gas powered and come with a stand or can be hand held. Caution should be used when operating such a machine. It may look harmless and easy to run, but drilling machines have many hazards.

Safe Operating Guidelines:

Clean the flanges before mounting the blade. Make sure the blade is correct for the material being cut and the arrow on the blade corresponds with the direction of rotation of the machine spindle. Avoid tilting the blade when cutting. Use only the machines that have an approved safety guard. Remove the diamond blade from the machine during transit to prevent accidental damage. Inspect the blades frequently to detect cracks or undercutting of the steel center. Don't let excessive heat be generated at the cutting edge of the blade. Use adequate water supply to both sides of the blade. Follow the manufacturers recommended pulley sizes and operating speeds for specific blade diameters. Make sure to tighten drive belts to ensure full available power. Don't force the blade on the blade shaft or mount blade on an undersized spindle.

Potential Hazards:

- Electrical shock
- Flying debris
- Severe cuts
- Hearing loss
- Breathing fumes or dust

Training Requirements:

- Review of Applicable SOPs (SH&E 610, *Hand and Power Tools* & SH&E 611, *Electrical Safety-Portable Electrical Equipment*)
- Demonstrated knowledge on the use of a coring machine
- Review and follow manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Leather gloves
- Face shield
- Hearing protection
- Respirator or dust mask

Other Safety Tips:

- Keep fingers and hands away from the cutting edge.
- Hold handle firmly when operating.
- A subsurface utility clearance should be performed prior to initiating drilling operations.

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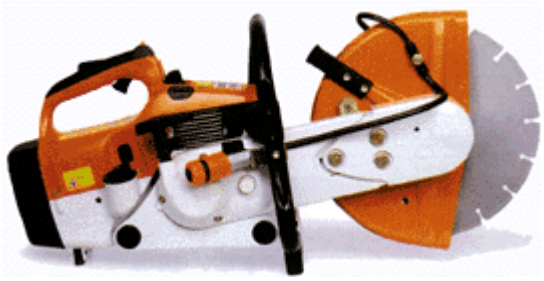
CUT-OFF SAWS

Objective / Overview:

Cut-off saws are high-speed cutting tools and very dangerous to operate. Therefore, it is very important to review the general safety rules, training, PPE and procedures for working with portable cut off saws. Cut off saws are used in a variety of activities (i.e. concrete, piping, metal, etc.).



Safe Operating Guidelines:

Starting - Start the saw on firm ground or other solid surface in an open area. Never attempt to drop-start the engine. Clear the working area. Avoid operating the saw if the terrain is wet and/or frozen.

Handling - Hold the saw firmly with two hands when the engine is running, *and whenever the blade is rotating until it comes to a complete stop*. Carry the saw with engine stopped, muffler away from your body, while protecting the cutting wheel from striking the ground or other objects.

Cutting - Begin cutting at full throttle and continue at full throttle until the cut is finished. Avoid standing in a direct line with the cutting wheel. Use only downward pressure on the saw, as lateral pressure may cause the blade to break and shatter. Do not change the direction of the cut once started, as this can also cause the blade to break and shatter. Do not use abrasive-type wheels for rough grinding. Do not cut above shoulder height.

Maintenance - Shut off the engine and remove the spark plug wire before adjusting or working on the saw.

Potential Hazards:

- Kickback – Sudden and violent reverse movement of the saw
- Hearing loss
- Flying debris
- Severe cuts
- Burns from engine
- Fire Hazard from sparks and gasoline
- Hand / arm vibration syndrome

Training Requirements:

- Review of Applicable SOPs (SH&E 610, *Hand and Power Tools*)
- Demonstrated knowledge on the use of a cut off saw
- Review and follow manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Face shield
- Chainsaw Chaps
- Leather gloves
- Hearing protection: earplugs and/or earmuffs
- Respirator if required (concrete operations)

Never drop-start saw

Other Safety Tips:

- Keep flammable and combustible materials away from saw while cutting metal.
- Make sure the fuel cap is properly secured.
- Inspect the abrasive wheel for cracks and chips. If cracked or chip replace wheel before use.
- Ensure guard is positioned properly prior to start-up (SH&E 609, *Machine Guarding*).
- Never try to drop-start the engine (see picture).

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GENERATOR

Objective / Overview:

Portable generators should be used with extreme caution in order to prevent personal injury. When using a portable generator it's important to follow the manufacturer's instructions to avoid injuring someone or damaging your generator or appliances. Allow only trained, authorized personnel to operate the generator. Along with training, other safety measures include: proper maintenance of equipment and personal protective equipment.

Safe Operating Guidelines:

Follow manufacturer's recommended operating instructions, every generator is not the same. Maintain adequate ventilation. Generators emit carbon monoxide (CO). Never operate a generator in an enclosed building without proper ventilation. Turn the generator off to refuel. Gasoline and its vapors may ignite if they come into contact with hot components or an electrical spark, store fuel in a properly designed container in a secure location. To avoid a shock, make sure that your hands are dry and you're standing in a dry place whenever you operate the generator. Turn off equipment and lights supplied by the generator until it is running. Use the right extension cord. Use only UL-listed, three-prong extension cords. Be sure the extension cord is the proper size (wire-gauge) to handle the electric load that will be plugged into it. Make sure the generator is properly grounded prior to each use. If you intend on using a portable generator to tie into the wiring of an existing structure this shall be done only by a licensed electrician.

Potential Hazards:

- Burns from contact with the hot muffler or engine
- Shocks/electrocution
- Noise exposure
- Inhaling exhaust gases, CO

Training Requirements:

- Review of Applicable SOPs (SH&E 611, *Electrical Safety-Portable Electrical Equipment*)
- Demonstrated knowledge on the use of a generator
- Review of manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Leather Gloves
- Hearing Protection
- Long Sleeve Shirt (i.e., to shield from burns, etc.)

Other Safety Tips:

- Have a Class A:B:C fire extinguisher readily available at all times.

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SAFETY CARD

HAND HELD GRINDERS

Objective / Overview:

Hand held grinders are high-speed electric- or pneumatic-powered grinding tools used to shape or cut metal, and can be dangerous to operate. Grinders are used in a variety of activities (i.e., piping installation/repair, metal, restoring, polishing, sharpening, etc.).

Potential Hazards:

- Kickback – Sudden and violent reverse movement of the grinder.
- Flying debris.
- Severe cuts.
- Fire Hazard from sparks igniting nearby debris or objects.
- Hand / arm vibration syndrome.

Safe Operating Guidelines

Basic safety rules can help prevent hazards associated with the use of hand-held grinders:

- Never carry the tool by the cord (or the hose for pneumatic tools).
- Never yank the cord or the hose to disconnect the tool from the receptacle.
- Keep cords and hoses away from heat, oil, and sharp edges.
- Denergize tools when not in use, before servicing, and when changing accessories such as blades/bits/cutters.
- All observers should be kept at a safe distance from the work area.
- Always secure work with clamps or a vise, freeing both hands to operate the tool.
- Avoid accidental starting, do not hold a finger on the trigger/switch while carrying a powered tool.
- Tools should be maintained with care. They should be kept clean and sharp for the best performance. Follow instructions in the user's manual for lubricating and care instructions.
- Be sure to keep footing and maintain proper balance.
- The proper apparel should be worn. Loose clothing or jewelry can become caught in moving parts.
- Inspect tool before every use. Damaged tools must be removed from use and tagged "DO NOT USE".

Training Requirements:

- Review applicable SOPs (SH&E 610, *Hand and Power Tools* and SH&E 611, *Electrical Safety-Portable Electrical Equipment*).
- Demonstrated knowledge on the use of a hand-held grinder.
- Follow manufacturers operating guidelines, especially for proper grinding wheel attachment.

Personal Protective Equipment:

- Leather gloves
- Safety glasses (with sideshields)
- Hearing protection: earplugs and/or earmuffs
- Other PPE as necessary for the worksite/activity

Other Safety Tips:

- Keep flammable and combustible materials away from the grinder.
- Have a fire extinguisher on hand while using grinder.
- Inspect the abrasive wheel for cracks and chips. If cracked or chipped replace wheel before use.
- Ensure safety guard(s) is positioned properly prior to start-up.
- **Never clamp a hand held grinder in a vice.**

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SAFETY CARD

IMPACT WRENCHES

Objective / Overview:

Impact wrenches are mainly used for tire changing but that does not limit their use. They can be used in all applications when a certain amount of torque is needed to loosen or tighten nuts and bolts. The danger comes in to play when employees try to use the wrong sockets with an air wrench. Employees using air wrenches must have general understanding of how to use them.

Safe Operating Guidelines:

Drain water from air compressor tank and condensation from air lines. Disconnect the tool from the air supply before lubricating or changing sockets. Impact wrench sockets and accessories must be used with this tool. Do not use hand sockets and accessories. Select the required impact socket. Connect tool to air hose of recommended size. The use of a quick connect set makes connecting easier. Never use a wire, soft pin, or nail to hold the socket onto the square spindle of the impact wrench. If the proper retaining device on the tool is broken, the tool should be repaired. On applications where a low or critical level of torque is required, it is recommended that you impact each fastener lightly, and then perform the final tightening with a hand torque wrench.

Potential Hazards:

- Flying debris
- Hearing loss
- Cuts
- Hand / arm vibration syndrome

Training Requirements:

- Review of Applicable SOPs (SH&E 610, *Hand and Power Tools*)
- Demonstrated knowledge on the use of a electric drill
- Review and follow manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Leather gloves/anti-vibration gloves
- Hearing protection

Other Safety Tips:

- Be sure no one is below when using the tool in high locations.
- The proper fastening torque may differ depending upon the kind or size of the bolt.
- Check the torque with a torque wrench.

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SAFETY CARD

POWER DRILL

Objective / Overview:

Available in a variety of types and capacities, portable power drills are undoubtedly the most used power tools. Because of their handiness and application to a wide range of jobs, drills often receive heavy use. For this reason, you'll need to carefully check your drill's capacity limitations and accessory recommendations.

Safe Operating Guidelines:

Check carefully for loose power cord connections and frays or damage to the cord. Replace damaged tool and extension cords immediately. Be sure the chuck is tightly secured to the spindle. This is especially important on reversible type drills. Tighten the bit securely as prescribed by the owner / operator's manual. The chuck key must be removed from the chuck before starting the drill. A flying key can be an injury-inflicting missile. Check auxiliary handles, if part of the tool. Be sure they are securely installed. Always use the auxiliary drill handle when provided. It gives you more control of the drill, especially if stalled conditions occur. Grasp the drill firmly by insulated surfaces. Always hold or brace the tool securely. Brace against stationary objects for maximum control. If drilling in a clockwise -- forward -- direction, brace the drill to prevent a counter-clockwise reaction. Don't force a drill. Apply enough pressure to keep the drill bit cutting smoothly. If the drill slows down, relieve the pressure. Forcing the drill can cause the motor to overheat, damage the bit and reduce operator control.

Potential Hazards:

- Electrical shock
- Leaving chuck wrench in tool
- Puncture wounds
- Flying debris
- Severe cuts
- Fire
- Burns (hot bits)
- Sprains/strains (wrist)

Training Requirements:

- Review of Applicable SOPs (SH&E 610, *Hand and Power Tools* & SH&E 611, *Electrical Safety-Portable Electrical Equipment*)
- Demonstrated knowledge on the use of a power drill
- Review and follow manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Leather Gloves

Other Safety Tips:

- Electric drills must be double-insulated or plugged into a GFCI outlet.
- Never carry tool by cord or yank it to disconnect from receptacle.
- Keep cord away from sharp edges.

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SAFETY CARD

PRESSURE WASHERS

Objective / Overview:

High pressure washers can operate up to pressures of 5,000 psi and come in a variety of types ranging from gas operated to electrical. If not used correctly and safely, pressure washers can be a dangerous piece of work equipment. Earth Tech only allows trained, authorized personnel to operate the high pressure washers. Along with training, other safety measures include: reviewing the manufacturers instructional booklet, proper maintenance of equipment, and personal protective equipment.

Safe Operating Guidelines:

The gun valve must always be pointed at the work area, NEVER point the gun valve at yourself or another person. High pressure washers shall be used to clean or decontaminate equipment, surfaces or structures only. High pressure washers WILL NOT be used to clean or decontaminate workers or personal protective equipment while it is being worn. Always set the tripper safety lock when the gun valve is not in use.

Potential Hazards:

- Kickback – Sudden and violent reverse movement of the gun
- Flying debris
- Slips and trips on wet surfaces and hoses
- Exhaust fumes/carbon monoxide (CO) in enclosed spaces
- Severe cuts

Training Requirements:

- Review of Applicable SOPs (SH&E 613, *Pressure Washers*)
- Demonstrated knowledge on the use of a pressure washer
- Review of manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Hard hat with faceshield
- Heavy gloves
- Hearing protection
- PVC (or equivalent) rain suit

Other Safety Tips:

- Never fill a pressure washer fuel tank with fuel while the engine is running or if the engine is still hot
- Non-operators must remain a minimum of 25 feet from the operator
- High pressure washing equipment should be cleaned often to avoid dirt buildup, especially around the trigger and guard area
- Always set the trigger safety lock when the gun valve is not in use
- Relieve the pressure in the system before coupling and uncoupling hoses
- Visually inspect the full length of high pressure discharge hose and inspect other high pressure fluid-handling components for abrasions or cuts, damage caused by exposure to chemicals and for damage caused by kinks in the hose

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RECIPROCATING SAW

Objective / Overview:

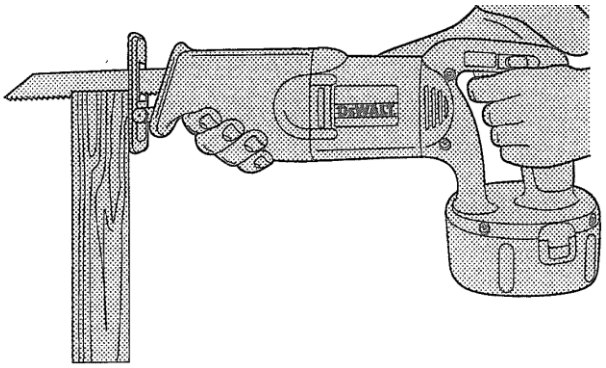
The versatility of the reciprocating saw, in cutting metal, pipe, wood and other materials have made it a widely used tool. By design, it is a simple tool to handle. Its demands for safe use, however, are very important.

Safe Operating Guidelines:

Use sharp blades. Dull blades can produce excessive heat, make sawing difficult, result in forcing the tool, and possibly cause an accident. Position yourself to maintain full control of the tool, and avoid cutting above shoulder height. To minimize blade flexing and provide a smooth cut, use the shortest blade that will do the job. The work piece must be clamped securely, and the shoe of the saw held firmly against the work to prevent operator injury and blade breakage. Maintain firm contact between the saw's shoe and the material being cut. When making a "blind" cut (you can't see behind what is being cut), be sure that hidden electrical wiring, or water pipes are not in the path of the cut. If wires are present, they must be disconnected at their power source by a qualified person or avoided, to prevent the possibility of lethal shock or fire. Water pipes must be drained and capped. Always hold the tool by the insulated grouping surfaces. When making anything other than a through cut, allow the tool to come to a complete stop before removing the blade from the work piece. This prevents breakage of the blade, and possible loss of tool control. Different work surfaces demand different blades.

Potential Hazards:

- Flying debris
- Hearing loss
- Cuts
- Hand / arm vibration syndrome



The correct way to hold the reciprocating saw while operating.

Training Requirements:

- Review of Applicable SOPs (SH&E 610, *Hand and Power Tools*)
- Demonstrated knowledge on the use of a reciprocating saw
- Review and follow manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Leather Gloves/anti-vibration gloves
- Hearing protection

Other Safety Tips:

- Do not operate reciprocating saw in explosive atmospheres.
- Do not overreach. Keep proper footing and balance at all times.
- Do not use tool if switch is not operating correctly.
- Check for misalignment or binding of moving parts, breakage or parts and any other condition that may affect the tool's operation.
- Always use two hands to operate saw (see picture).

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ROUGH TERRAIN FORKLIFTS

Objective / Overview:

According to OSHA, an estimated 100 fatalities and 95,000 injuries annually are caused by unsafe operation of forklifts. This includes rough terrain forklifts (e.g., lulls, Skytrak telehandlers, etc.). A rough terrain forklift is a wheel-type truck designed primarily as a lift truck having a vertical mast or pivoted boom (sometimes both). Rough terrain forklifts also have a variable length reach and may be equipped with attachments. This type of forklift is intended for operation on improved natural terrain and at many construction sites. Along with mandatory operator training, measures to promote safe operation include reviewing the manufacturer's instructional booklet, proper maintenance procedures, and use of PPE.

Safe Operating Guidelines:

Prevention measures are numerous, but a few things are clear: operator training, pre-task planning, and proper equipment maintenance/inspections are the cornerstones of safe use of all mobile equipment, including rough terrain forklifts. In accordance with SH&E 606, *Forklifts*, operators must, prior to being permitted to operate a forklift, provide a copy of their driver's license and a valid Industrial Lift Truck Card issued by an authorized source. Loads must not exceed rated lift capacity as unstable and dangerous machine conditions will result. Only lift the load vertically; never drag or tow a load horizontally.

Training Requirements:

- Operators must pass a combination oral/written/operational performance test approved by the SH&E Manager that demonstrates the ability to safely use a rough terrain forklift. Operators will receive refresher training every 3 years or when an accident, near-miss, or indication of unsafe operation occurs.
- Observance of all provisions and operating rules contained in SH&E 606, *Forklifts.*
- Review of manufacturer's operating guidelines for each specific type/model of rough terrain forklift and proper THA/JSA reviewed/completed for the task.
- Review of methods for properly performing a daily pre-operation forklift inspection. A sample pre-operation inspection checklist is provided as an Attachment to SH&E 606, *Forklifts.*

Other Safety Tips:

- Do not exceed the truck manufacturer's capacity of the rough terrain forklift truck as equipped for handling suspended loads
- Conditions that may affect stability include ground/floor conditions, speed, counterweight location, operator judgment, grade, loading, wheelbase, and improper tire inflation.

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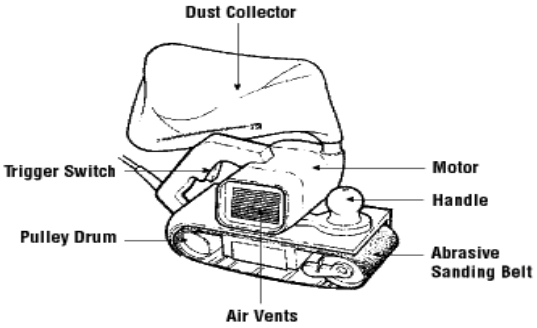
SANDERS

Objective / Overview:

Sanders are commonly used at project sites for a variety of tasks. Often times the hazards associated with sanders are overlooked; they don't appear threatening because they don't have sharp blades or bits. These misconceptions can be prevented through proper training and PPE selection.



Safe Operating Guidelines:

Make sure the sander is switched "OFF" before connecting the power supply. Disconnect power supply before changing a sanding belt, making adjustments, or emptying dust collector. Inspect sanding belts before using them. Replace those belts that are worn or frayed. Install sanding belts that are the same widths as the pulley drum. Adjust sanding belt tension to keep the belt running true and at the same speed as pulley drum. Secure the sanding belt in the direction shown on the belt and the machine. Keep hands away from the sanding belt. Use two hands to operate sanders – one on the trigger and the other on the front handle knob. Clean dust from the motor and vents on a regular basis. Do not use a sander without an exhaust system or dust collector present that is in good working order. Empty the collector when ¼ full. Do not exert excessive pressure on a moving sander. The weight of the sander provides adequate pressure for the job. Do not work on unsecured stock unless it is heavy enough to stay in place. Do not overreach. Always keep proper footing and balance. Do not cover air vents of the sander. Check often to ensure that guards are in their normal position. Before starting a sander, be sure the power cord and extension cords are out of the belt path and are long enough to freely complete the task. The sander must be either double insulated or connected to a GFCI.

Potential Hazards:

- Kickback – Sudden and violent reverse of the sander
- Hearing loss
- Flying debris
- Severe abrasive cuts
- Electrocution
- Explosion/fire hazard from the dust

Training Requirements:

- Review of Applicable SOPs (SH&E 609, *Machine Guarding* and SH&E 610, *Hand and Power Tools*)
- Review and follow manufacturers operating guidelines

Personal Protective Equipment (Level D PPE) and:

- Hearing protection
- Leather gloves

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UTILITY KNIVES / RAZORS

Objective / Overview:

Utility knives serve a variety of purposes at worksites, and can be a useful tool, when used safely and correctly. Learning proper positioning and correctly using a utility knife will drastically reduce the potential of cut related injuries.

Safe Operating Guidelines:

Always be sure that knives are sharp and not dull. A dull blade will require more force to cut, increasing the likelihood of slipping. Be sure to blade is seated in the frame of the knife correctly, closed, and fastened together properly. Always keep body parts away from the cut line, (e.g., fingers), and ensure that the material being cut is on firm ground and not against a body part (cutting rope against your leg). Always pull the knife, never push the knife (the blade may break, and momentum could cause the body to come into contact with broken blade). Always retract the blade when not in use.

Potential Hazards:

- Lacerations from direct contact with the blade
- Lacerations from blade breaking or shattering
- Ergonomics

Training Requirements:

- Review of Applicable SOPs (SH&E 610, *Hand and Power Tools*)
- Demonstrated knowledge on the safe use of a utility knives
- Review and follow manufacturers operating guidelines for specialized or unusual knives.

Personal Protective Equipment (Level D PPE) and:

- Cut resistant gloves (Kevlar, thick leather, etc.).

Other Safety Tips:

- Purchase safety equipped utility knives with guarding or automatically retracting blades
- Replace dull blades – When knife begins to tear rather than cut, it is a good indicator the blade is dull.
- Always wear a cut resistant glove on your free hand.
- Always use the right tool for the job – NEVER use the blade as a screwdriver or prying tool.
- When using a knife to cut thicker materials, use several passes. Increased force on the blade can cause it to stray from the intended cut path, or break the blade.
- When changing blades, always handle from the non-sharp side. Cover blade with duct tape and dispose.
- Use an alternate tool when possible (scissors, wire cutters, etc.)

Utility Knives with Gaurding

Attachment D: Site-Specific Spill Reporting Card

ENVIRONMENTAL RELEASE/SPILL EMERGENCY PROCEDURES

In the event of an environmental release or spill (REGARDLESS OF QUANTITY), the following procedures will be followed:

1. Secure the area and contain the release or spill, if possible.
2. If emergency services are required, call appropriate emergency services numbers to report the quantity and contents of the release or spill.
3. Contact the AECOM Project Manager, David Wacker, at (210) 253-7514 (office) or (210) 859-1693 (cell) to report the details of the incident.
4. Notify the Site Supervisor, Scott Beesinger, at (903) 679-3448 (office) or (903) 217-9954 (cell) to report the contents and quantity of the release or spill.
5. Notify the Site Safety Officer, Scott Beesinger, at (903) 679-3448 (office) or (903) 217-9954 (cell) to report the contents and quantity of the release or spill.
6. Notification of the LHAAP Representative Aaron Williams, at (918) 669-4915 (office) to report the contents and quantity of the release or spill.
7. Call the AECOM Incident Reporting Line at 800-348-5046 and Nash Doyle at 312-373-7813 to report the incident.
8. If the release or spill meets state, federal or local reporting requirements and AECOM is directed by the LHAAP team leaders, report the release or spill to the appropriate regulatory agencies (see other side).
9. Provide a written statement summarizing the incident to your Supervisor to be included in the Supervisor's Report of Incident.

REGULATORY AGENCY CONTACT NUMBERS FOR REPORTING CHEMICAL SPILLS AND RELEASES

When a chemical spill or release occurs in Texas, there are a number of reporting and notification requirements that must be followed by the agency or individual responsible for the spill. Therefore, prior to notifying a regulatory agency(s) of a release or spill, the appropriate regulations should be consulted to determine reportable quantities, reporting requirements, scenarios, notification timelines, required documentation and/or agencies to contact. In some cases, reporting or notification of a spill or release to a regulatory agency(s) may not be required.

A list of regulatory agencies and contact numbers is provided below, but is not inclusive of all release or spill scenarios, such as transportation accidents involving hazardous substances, releases to air or releases from oil and gas wells or pipelines. In some cases, several regulations overlap requiring notification to multiple agencies. However, in all cases, the LHAAP team leaders should be consulted first prior to notification of a regulatory agency.

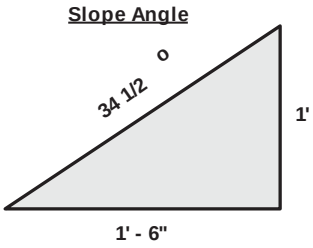
Agency	Phone #	Examples of When To Call
National Response Center (NRC)	1-800-424-8802	• Releases from a fixed facility that exceed the RQ for that specific chemical (per SARA Title III List of Lists); immediate verbal notification • Releases of petroleum products and certain hazardous substances listed under the Federal Clean Water Act (40CFR Part 116) • Releases of hazardous substances from regulated storage tanks in excess of RQ (40 CFR Part 302.6); report within 24 hours
Texas Commission on Environmental Quality (TCEQ) 24-hr Emergency Response Phone Number.	1-800-832-8224	• Releases from a fixed facility that exceeds the RQ for that specific chemical (per SARA Title III List of Lists); immediate verbal notification followed by written • Release of hazardous waste stored in tanks at RCRA permitted facilities and large quantity generators greater than one pound; written notification within 30 days • Releases of any chemical, oil, petroleum product, sewage, etc., no matter how small, which may enter waters of the state (including surface water, ground water and dry gullies or storm sewers leading to surface water); immediate verbal notification; written notification within 5 days • Releases of petroleum products and certain hazardous substances listed under the Federal Clean Water Act (40CFR Part 116)
Harrison County Texas, Emergency Management Coordinator	903-935-4870 Mr. Tom Mock Spill Phone: 903-923-4000 or 911	• Petroleum releases of 25 gallons or more (or that cause a sheen on nearby surface waters) from regulated storage tanks; verbal notification within 24 hours • Releases of hazardous substances from regulated storage tanks in excess of RQ (40 CFR Part 302.6); report within 24 hours • After-hours contact the TCEQ's Emergency Spill Reporting Line
TCEQ Regional Office: Harrison County (TCEQ Region 5, Tyler, Texas)	903-535-5100	

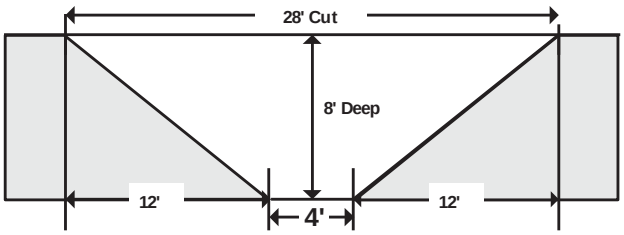
Attachment E: Equipment Inspection Checklist

S3NA-303-FM Daily Excavation Checklist

Daily Excavation Checklist			
Competent Person:	Date:		
Site Location:	Job Number:		
Soil Type: Excavation Depth:	Excavation Width:		
Type of Protective System Used:			
Indicate for each item: Yes – No – or N/A for not applicable:			
1. General Information:	**Yes**	**No**	**N/A**
A. Is excavation less than five feet in depth?			
B. Is there a potential for a cave-in? ***IF YES, excavation must be sloped, shored, or shielded.**			
C. Is excavation deeper than 5 feet? *** IF YES, excavation must be sloped, shored, or shielded.**			
D. Is sloping used as your protective system?			

Slope information to keep in mind:





Example of a Simple 34-degree Slope commonly used around the site for cave-in protection.

E. 1- Manual and 1- Visual Method utilized to determine Soil Classification as A-B-C.			
2. Inspection of Job Site	**Yes**	**No**	**N/A**
A. Excavations, adjacent areas, and protective systems inspected by a competent person daily before the start of work.			
B. Competent person has the authority to remove all individuals from the excavation immediately.			
C. Surface encumbrances removed or supported.			
D. All individuals protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.			
E. Hard hats, safety-toed boots, and safety glasses worn by all individuals.			

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F. Spoils, materials, and equipment set back at least 2 feet from the edge of the excavation.			
G. Adequate barriers provided at all excavations, wells, pits, shafts, etc.			
H. Warning vests or other highly visible clothing provided and worn by all individuals. Wearing a vest at all times around heavy equipment is required.			
I. All individuals are required to stand away from vehicles being loaded or unloaded.			
J. Warning system established and utilized when mobile equipment is operating near the edge of the excavation (e.g., barricade tape, signalpersons, stop logs, etc).			
K. All individuals prohibited from going under suspended loads.			

3. Utilities	**Yes**	**No**	**N/A**
A. Location of utilities marked.			
B. Prior to the use of equipment, underground utilities have been located by hand digging.			
C. Underground utilities are protected, supported, or removed when excavation is open.			

4. Means of Access and Egress:	**Yes**	**No**	**N/A**
A. Travel distance to means of egress no greater than 25 feet in excavations 4 feet or more in depth.			
B. Straight ladders used in excavations extend at least 3 feet above the edge of the trench.			
C. Ramps being used for employee access have been designed by the competent person.			
D. All individuals are protected from cave-ins when entering or exiting the excavation.			

5. Wet Conditions:	**Yes**	**No**	**N/A**
A. Precautions have been taken to protect all individuals from the accumulation of water.			
B. Water removal equipment monitored by a competent person.			
C. Surface water or runoff is diverted or controlled to prevent accumulation in the excavation.			
D. Inspections have been made after every rainstorm or other hazard-increasing occurrence (freeze/thaw, local demolition, rerouting of traffic, etc).			

6. Hazardous Atmosphere: The atmosphere within the excavation must be tested where there is a reasonable possibility of an oxygen deficiency or a combustible or other harmful contaminant exposing any individual to a hazard.	**Yes**	**No**	**N/A**
A. Are there exposed sewer or natural gas lines in excavation?			
B. Is excavation near a landfill area, or are hazardous substances being stored close to the excavation?			
If you answered YES to A or B, then treat the excavation as a confined space. **See *S3NA-301-PR Confined Spaces***			
C. All individuals will contact the Fire/Rescue Group at prior to entry and in case of emergencies.			

7. Support Systems:	**Yes**	**No**	**N/A**
A. Materials and/or equipment for support systems are selected based on soil analysis, trench depth, and expected loads.			

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B. Materials and equipment used for protective systems have been inspected and are in good condition.			
C. Materials and equipment not in good condition have been removed from service.			
D. Protective systems installed without exposing all individuals to the hazards of cave-ins, collapses, or the threat of being struck by materials or equipment.			
E. Members of support system are securely fastened to prevent failure.			
F. Support systems are provided to ensure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.			
G. Excavations below the level of the base of a footing have been approved by a registered Professional Engineer.			
H. Removal of support systems progresses from the bottom, and members are released slowly so that you can note any indication of possible failure.			
I. Backfilling progresses with the removal of the support system.			
J. Material is excavated to a level no greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.			
K. A shield system has been placed to prevent lateral movement.			
M. All individuals are prohibited from remaining in the shield system during vertical movement.			
8. Training:	**Yes**	**No**	**N/A**
A. All individuals have had Excavation Safety Awareness Training.			

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Drill Rig Inspection Checklist

Date	Equipment Model/Type:
Project Name:	Serial or License #
Project #	Location Owner/Operator:
Project Manger:	Inspector:
Place a (✓) in the "Yes" column if the requirement has been met. If a "No" is encountered, equipment must be removed from operation until the deficiency has been corrected. Describe deficiencies on page two of this form. Use the Comment column to note any additional information needed to certify the equipment. If a checklist item is found to be "Not Applicable," check "NA" and provide a comment in the appropriate box.	

Item Name	Requirement	Yes	No	NA	Comment
Hydraulic systems controls and levers	No leak fittings or connections. Levers are in good operating condition. Fluid levels are full.				
Fuel, oil, water, and coolant lines	No leaks.				
Hoses	No leaks in hoses or connections. No signs of excessive wear, kinked or bent hoses.				
Gauges	Operational and visible to operator.				
Emergency kill switch and life line	Operational and accessible to operator.				
Shear pins	In place.				
Drive chains	No signs of excessive wear, broken or defective links.				
Parking brakes	Set and operational.				
Outriggers	No leaks. Set on pads (as necessary to avoid damage).				
Windshield Wipers	Operational.				
Lights (head, tail and running lights)	Operational and without cracked lenses.				
Back-up alarm	Operational, spotter used.				
Cables and ropes	No fraying, bird nesting, flattening, stretching. Must be braided or properly clamped at connections.				
Pulleys, drums and spools	No excessive wear or cracking.				
Derrick/Mast	Locked in position. Frame is not cracked or bent.				

Item Name	Requirement	Yes	No	NA	Comment
Hoists	Properly spooled cable, rated to lift loads.				
Safety equipment	Safety harness, fire extinguisher, flares, safety reflectors, first aid kit, grounding wire for fueling, and spill response equipment (for fueling and repairs).				
Guards	Power take-offs (PTOs) and all rotating parts designed with guards. Guards must have warning labels.				
Miscellaneous (as applicable)	Diverter systems; auger and head seals; cyclones; grout plant guards; etc. (list): • • •				

DEFICIENCIES (Explain all negative response and list corrective actions; all deficiencies must be corrected before the rig is entered into service):

1.
2.
3.
4.
5.

Other Repairs, Routine Maintenance and/or Comments:

Inspection Conducted and Certified by:

	Print Name:	Signature	Date:
Owner / Operator			

Checklist Reviewed by:

	Print Name:	Signature	Date:
AECOM PM or SSO			

AECOM

S3NA-309- FM2 Heavy Equipment Pre-Operation Checklist

Project Name/Location:															
Number/Name:							**Make/Model:**								
Hour meter reading:															
Check the following as appropriate	**Operator Name/Date**			**Operator Name/Date**			**Operator Name/Date**			**Operator Name/Date**			**Operator Name/Date**		
	SAT	**UNSAT**	**N/A**	**SAT**	**UNSAT**	**N/A**	**SAT**	**UNSAT**	**N/A**	**SAT**	**UNSAT**	**N/A**	**SAT**	**UNSAT**	**N/A**
1. Operator qualified															
2. Overhead guard (ROPS)															
3. Horn															
4. Lights															
5. Parking brake															
6. Service brakes															
7. Steering															
8. Oil level															
9. Hydraulic oil level															
10. Radiator fluid level															
11. Major fluid leaks															
12. Windows															
13. Backup alarm															
14. Tires (visual)															

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15. Seat belts															
16. Fuel leaks															
17. Fire extinguisher															
18. Fuel lines secure															
19. Electrical lines															
20. Exhaust components															
Comments/Remarks:															

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[Equipment Inspection Checklists will be added as necessary]

Attachment F: Respiratory Protection Plan

AECOM

Site-Specific Respiratory Protection Program for the Longhorn Army Ammunition Plant, Karnack, Texas Site

1.0 Selection of Respiratory Protection

All respiratory protection used by AECOM personnel must be selected according to 29 CFR 1910.134 and S3NA-519-PR. The implementation of this program will be under the direct supervision of Daniel Schilling (DHSM) and assisted by David Wacker (Project Manager). In order to simplify this procedure for field implementation, the following action levels have been determined for this project:

Specific Equipment	Action Level/Monitoring	Activity/Location
MSA Ultra-Twin w/ P-100 cartridges)	5-10 mg/m^3 particulates in air	Where required
North Model 5400	5-10 mg/m^3 particulates in air	Where required

2.0 Use of Respiratory Protection

Based on the site-specific chemical hazards and the anticipated site activities, the following respiratory protection is anticipated to be used at this project.

Activity/Location	Respiratory Protection Anticipated
Multiple tasks area required different cartridges	Full face respirator (either MSA ultra twin or North model 5400)

Based on actual and anticipated site specific conditions, the following cartridge change-out schedule(s) have been calculated when using air-purifying respirators:

Cartridge/Canister (make and model)	Activity/Location	Change-Out Frequency
MSA P-100	Soil screening operations	End of shift
North P100 safety filter cartridge	Soil screening operations	End of shift
Organic vapors <1,000 ppm	During air sampling (temporary measure)	End of shift
Chlorine gas <10 ppm		End of shift
Hydrogen Chloride <50ppm	During loading/unloading operations	End of shift
Sulfur dioxide <50ppm		End of shift
Asbestos		End of shift
Radionuclides		End of shift

The change-out frequency table above was determined by Dan Schillings, DHSM and the calculations can be reviewed by contacting him at 210-601-4129.

All personnel onsite must be properly fit-tested for each type of equipment they may be required to use. The personnel qualified to perform this testing are (insert name of qualified ft tester(s).

The records of all fit tests for site personnel are maintained can be reviewed at (insert location).

Training records for respiratory protection may be reviewed at (insert location).

The following respiratory protective equipment has been assigned to specific individuals:

Employee Name	Equipment Type/Number	Size
Scott Beesinger	MSA Ultra Twin	L
Ray Wagner	MSA Ultra Twin	L
Don Coulombe	MSA Ultra Twin	L
	MSA Ultra Twin	L

Medical clearance records for users of respiratory protection can be reviewed contacting the District SH&E Manager.

A copy of all operating instructions for each type of equipment may be reviewed by contacting the SSO.

A respirator cleaning station has been set up at the site job trailer. This station includes the following items to assist in the cleaning process:

Equipment Included
Water
Soap
Neutral Detergent
Soft Brush
Respirator wipes

The following instructions will be posted at the respirator cleaning station to ensure adequate cleaning and disinfection:

Respirator Type	Step-by-Step Cleaning Instructions
All	Respirator wipes may be used an interim method for individually assigned respirators. They should not be the only method however and other methods should be in place. In either case the respirator should be thoroughly cleaned at the end of the shift.
	1. Remove filters/cartridges
	2. Clean with warm water (>120°F) with soft brush, neutral detergent with no oils or lanolin
	3. Disinfect facepiece by soaking in a solution of quaternary ammonia disinfectant or sodium hypochlorite (1 oz [30 ML] household bleach in 2 gallons [7.5 L] of water), or other disinfectant
	4. Rinse in fresh, warm water and air dry in non-contaminated atmosphere.
	5. Respirator components must be inspected prior to each use. A respirator with any damaged or deteriorated components must be repaired or discarded.
	6. The cleaned respirator should be stored away from contaminated areas when not in use.
	Additionally, see specific product user instructions packaged with each respirator facepiece for additional information.

3.0 Respirator Inspection

In addition to inspecting ALL respiratory protective equipment prior to use, these additional inspections will be conducted and documented:

Equipment	Frequency	Responsible Party
Respirators	Weekly (while on site)	Scott Bessinger, Ray Wagner

4.0 Respirator Storage

All respiratory protection utilized by AECOM employees must be stored in a convenient, clean, and sanitary location and according to specific manufacturer recommendations. Special attention must be paid to protecting respiratory protection from dusty conditions, temperature extremes, and potential contamination during storage.

The following storage procedures will be utilized for equipment used on a routine basis (i.e., storage during non use periods of a work shift or storage between work shifts):

Equipment	Storage Procedures
Respirators	Manufactures storage bag or 2 gallon zip lock bag out of the sunlight
Respirator Cartridges	With the respirators, the site office or with the office supplies

All equipment not routinely used will be stored according to the procedures outlined below:

Equipment	Storage Procedures/Location
Respirator cleaning supplies	With the office supplies

Any equipment not assigned to specific site personnel will be stored under the supervision of Glenn Hilton following the procedures outlined below:

Equipment	Storage Procedures/Location
N/A	

5.0 Surveillance of Work Area

Appropriate monitoring of the work area conditions shall be performed to establish the degree of employee exposure or stress. In order to simplify this surveillance, the following procedures have been determined for this project:

Monitoring Equipment Used	Frequency of Surveillance	Personnel/Area Monitored
MIE Model PDM-3 mini-RAM	Every 30 minutes	Soil Screening area
PID	Every 30 minutes	Varies
Specific monitoring instrument	Every 30 minutes	Varies

Records of the above surveillance will be documented in accordance with S3NA-602-PR, Exposure Monitoring. Documentation will be maintained by Dan Schillings, DSHM and WorkCare.

6.0 Quality Assurance of Breathing Air

Compressed air utilized for respiratory protection shall be of high purity. Breathing air shall meet at least the requirements of the specification for Grade D breathing air as established by the Compressed Gas Association.

Documentation assuring that breathing air meets the above specifications will be obtained by (insert name) by requesting such documentation from the vendor or supplier.

Site personnel can review this documentation via WorkCare.

7.0 Program Evaluation

There will be regular inspections and evaluations (at least monthly) to determine the continued effectiveness of this program. Documentation will be maintained by Scott Bessinger, and can be reviewed at the facility or the San Antonio, Texas office.

This RPP will be reviewed and updated whenever deficiencies are noted during monthly inspections or annually, whichever is more frequent.

8.0 Approvals

Project Manager:	Date
Dave Wacker	August 14, 2012
Site RPP Coordinator:	Date:
DSM:	Date:
Daniel Schillings	August 13, 2012

Appendix B: Quality Assurance Project Plan

FINAL
QUALITY ASSURANCE PROJECT PLAN
FOR
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

July 2014

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LIST OF FIGURES

Figure 1: LHAAP Site Location Map

LIST OF ACRONYMS and ABBREVATIONS

°C	degrees Celsius
µg/L	micrograms per liter
AECOM	AECOM Technical Services, Inc.
AR	Administrative Record
BRAC	Base Realignment and Closure Commission
CCASS	Construction Contractor Appraisal Support System
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO	Contracting Officer
COC	chain-of-custody
COPC	contaminant of potential concern
COR	Contracting Officer's Representative
CPARS	Contractor Performance Assessment Reporting System
CR	Cost Reimbursable
CSM	Conceptual Site Model
DGI	Data Gap Investigation
DoD	U.S. Department of Defense
DQI	data quality indicator
DQO	data quality objective
EISB	enhanced in-situ bioremediation
FFA	Federal Facility Agreement
FFP	Firm Fixed Price
FS	Feasibility Study
FTL	Field Team Leader
GC	gas chromatograph
GPS	global positioning system
GSA	U.S. General Services Administration
GWTP	groundwater treatment plant
HPLC	high performance liquid chromatography
ICS	interference check sample
IDL	instrument detection limit
IDW	investigation derived waste
IS	internal standard
IWWP	Installation-Wide Work Plan
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LHAAP	Longhorn Army Ammunition Plant
LOD	limit of detection
LOQ	limit of quantitation
LUC	Land Use Control
MDL	method detection limit
mg/L	milligrams per liter
MNA	monitored natural attenuation
MPC	measurement performance criteria

MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
ND	non-detected
OSWER	Office of Solid Waste and Emergency Response
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
pCi/L	picocuries per liter
PM	Project Manager
PMP	Project Management Plan
PP	Proposed Plan
PWS	Project Work Statement
QA	quality assurance
QAPP	Quality Assurance Project Plan
QASP	Quality Assurance Surveillance Plan
QC	quality control
QCSR	Quality Control Summary Report
QSM	Quality Systems Manual
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RL	reporting limit
ROD	Record of Decision
RPD	relative percent difference
RSD	relative standard deviation
SOP	Standard Operating Procedure
SOW	Scope of Work
TAL	target analyte list
TCE	trichloroethylene
TCEQ	Texas Commission on Environmental Quality
UFP	Uniform Federal Policy
U.S.	United States
U.S. Army	U.S. Department of the Army
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WAD	Work Authorization Directive
WERS	Worldwide Environmental Remediation Services

INTRODUCTION

All environmental monitoring and measurement efforts mandated or supported by the United States (U.S.) Environmental Protection Agency (USEPA) are subject to a centrally managed quality assurance (QA) system. A QA system is a structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization for ensuring quality in its work processes, products, and services. The USEPA QA system is based on the American National Standard, ANSI/ASQC E4-1994.

The Uniform Federal Policy (UFP) for Implementing Environmental Quality Systems was developed as a joint initiative between the USEPA, the U.S. Department of Defense (DoD), and the Department of Energy, to consistently implement the quality system requirements of ANSI/ASQC E4-1994. The UFP was transmitted to the USEPA Regional Administrators in June 2005 (USEPA Directive 9272.0-17) from the Office of Solid Waste and Emergency Response (OSWER). The directive determined the scope of the UFP to include mainly federal facilities, but also extends the UFP documentation more broadly for data collection projects conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA). USEPA Directive 9272.0-17 also states that Regions are strongly encouraged to consider the use of the UFP for other purposes including the RCRA corrective action program, as well as data collection related to the active management of hazardous waste generated by RCRA facilities. On December 21, 2005, OSWER issued a Memorandum informing Regional Science and Policy Directors that QA Project Plans prepared and approved according to the UFP meet all the QA Project Plan requirements issued by the Office of Environmental Information (QA/R-5).

In response to these directives and QA requirements, AECOM Technical Services, Inc. (AECOM) has prepared this site-specific QA Project Plan (QAPP) which presents the overall project description, project organization, responsibilities, and QA objectives for the project. This project-specific QAPP complies with all QA requirements and has undergone peer-review. This document was developed through a transparent and collaborative process including intra- and inter-agency use, and sharing and distributing information in correspondence directed to certain key individuals and persons.

The purpose of this project is to perform groundwater sampling, well installation, well development, surface water sampling, soil sampling, and air sampling activities for multiple sites at the Longhorn Army Ammunition Plant (LHAAP) under contract with the U.S. Army.

WORKSHEET #1: TITLE AND APPROVAL PAGE

Site Name/Project Name: Longhorn Army Ammunition Plant (LHAAP)

Site Location: Karnack, Texas

Document Title: Final Installation-Wide Quality Assurance Project Plan (QAPP), Sampling and Analysis at LHAAP, Karnack, Texas

Lead Organization: U.S. Department of the Army (U.S. Army)

Preparer's Name and Organizational Affiliation: Dave Wacker, AECOM Technical Services Inc. (AECOM)

Preparer's Address, Telephone Number, and E-mail Address: 112 East Pecan Street, Suite #400, San Antonio, TX 78205, (210) 253-7514, dave.wacker@aecom.com

Preparation Date: July 2014

Investigative Organization's Project Manager/Date: _____

Dave Wacker/AECOM

Investigative Organization's Project QA Officer/Date: _____

Rodney Croslen/AECOM

Lead Organization's USACE/Date: _____

Rick Smith/USACE

USACE Reviewer, QA Representative/Date: _____

Aaron Williams/USACE

WORKSHEET #2: QAPP IDENTIFYING INFORMATION

Site Name/Project Name: Sampling and Analysis at LHAAP

Site Location: Karnack, Texas

Contractor Name: AECOM

Contract Number: W912DY-09-D-0059

Contract Title: Remediation of Multiple Sites, LHAAP

Task Order: DS01

1. **Identify regulatory program:** CERCLA
2. **Identify approval entity:** U.S. Army
3. **The QAPP is (select one):** ☐ Generic ☒ Project Specific
4. **List dates of scoping sessions that were held:** August 9, 2012 and August 10, 2012
5. **List dates and titles of QAPP documents written for previous site work, if applicable:** Chemical Data Acquisition Plan and Contractor Quality Control (QC) Plan. Final Installation-Wide Work Plan Longhorn Army Ammunition Plant, Karnack, Texas, dated May 2011.
6. **List organizational partners (stakeholders) and connection with lead organization:**

   Texas Commission on Environmental Quality (TCEQ); U.S. Army, USEPA, U.S. Fish and Wildlife Service (USFWS).
7. **List data users:**

   USEPA, TCEQ, U.S. Army, U.S. Geological Survey (USGS).

If any required QAPP elements and required information are not applicable (NA) to the project, then circle the omitted QAPP elements and required information on the attached table. Provide an explanation for their exclusions below:

All required QAPP elements and required information are applicable to the project.

WORKSHEET #3: DISTRIBUTION LIST

QAPP Recipients	Title	Organization	Telephone Number	E-mail Address
Rick Smith	Project Manager	USACE - Tulsa	918-669-4956	richard.p.smith@usace.army.mil
Aaron Williams	Project Engineer	USACE - Tulsa	918-669-4915	aaron.k.williams@usace.army.mil
Rose Zeiler	BRAC Installation Manager	BRAC - LHAAP	479-635-0110	rose.zeiler@us.army.mil
Marilyn Plitnik	Army Environmental Command, ERM	USAEC	210-424-1701	marilyn.a.plitnik.civ@mail.mil
Robin Paul	Army Environmental Command, ERM	USAEC	210-446-2002	robin.e.paul4.civ@mail.mil
April Palmie	Remedial Project Manager	TCEQ	512-239-4152	april.palmie@tceq.texas.gov
Dale Vodak	QC Field Oversight	TCEQ	903-535-5147	dvodak@tceq.state.tx.us
Richard Mayer, PG	Remedial Project Manager	USEPA – Region 6	214-665-7442	mayer.richard@epamail.epa.gov
Paul Bruckwicki	Refuge Biologist	USFWS	903-679-4536	paul_bruckwicki@fws.gov
Jason Roesner	Deputy Refuge Manager	USFWS	903-407-0852	jason_roesner@fws.gov

Notes:

BRAC	Base Realignment and Closure Commission	TCEQ	Texas Commission on Environmental Quality
ERM	Environmental Restoration Manager	USACE	United States Army Corps of Engineers
LHAAP	Longhorn Army Ammunition Plant	USAEC	United States Army Environmental Command
QAPP	Quality Assurance Project Plan	USEPA	United States Environmental Protection Agency
QC	quality control	USFWS	United States Fish and Wildlife Service

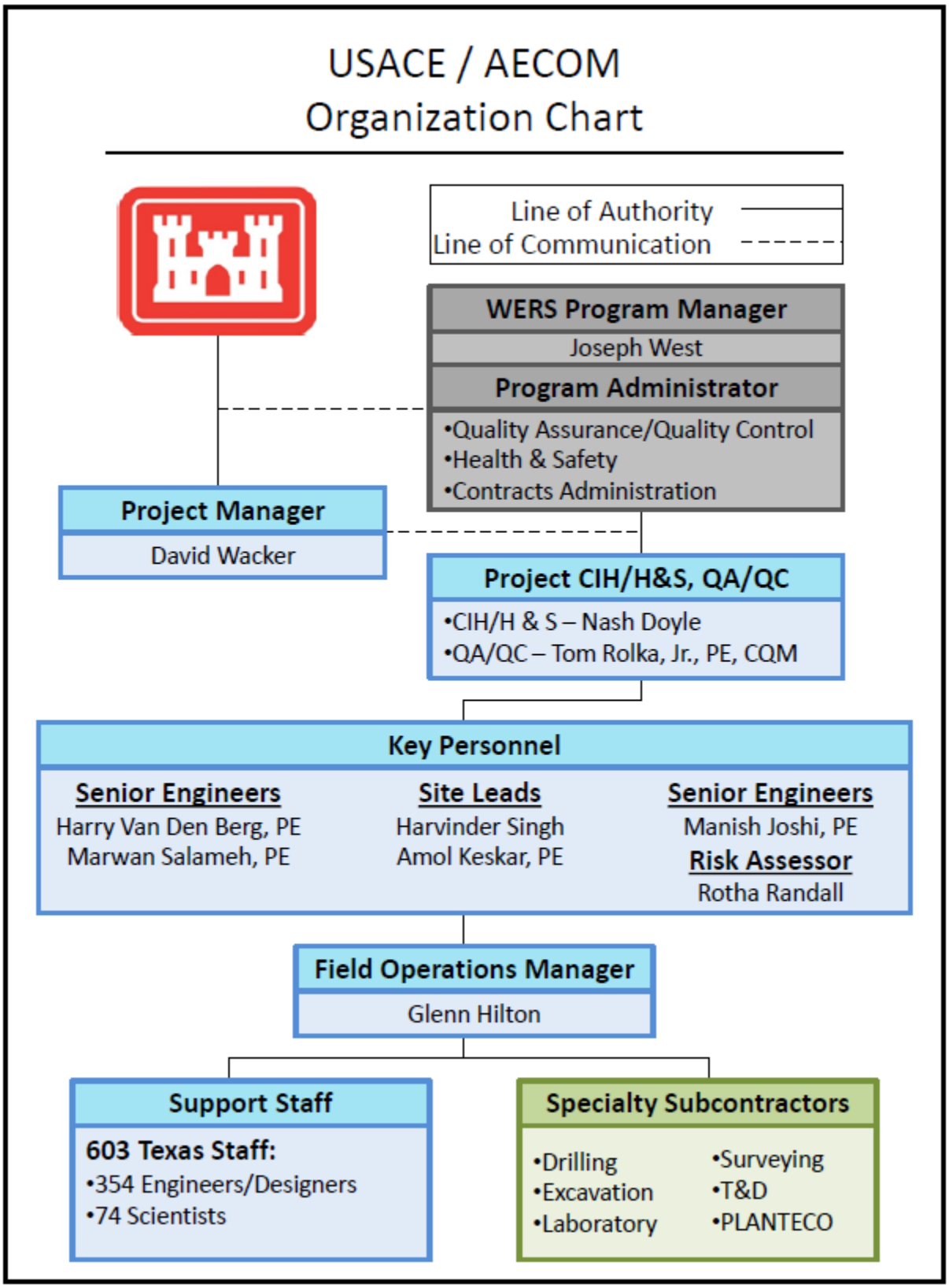
WORKSHEET #4: PROJECT PERSONNEL SIGN-OFF SHEET

Project Personnel	Title	Telephone Number	Signature	Date QAPP Read
Rick Smith	U.S. Army TOCOR	(918) 669-4956		
Scottie Fiehler	U.S. Army Alternate - TOCOR	(918) 669-7232		
Don Coulombe	AECOM QAO	(210) 253-7526		
Mark Heaston	AECOM Program Manager	(570) 394-0487		
Dave Wacker	AECOM Project Manager	(210) 253-7514		
Glenn Hilton	AECOM FTL	(210) 253-7533		
Linda Raabe	AECOM Project Chemist	(210) 253-7518		

Notes:

AECOM	AECOM Technical Services, Inc.
FTL	Field Team Lead
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
TOCOR	Task Order Contracting Officer Representative
U.S. Army	United States Department of the Army

WORKSHEET #5: PROJECT ORGANIZATIONAL CHART



WORKSHEET #6: COMMUNICATION PATHWAYS

Communication Drivers	Responsible Entity	Name	Phone Number	Procedure (Timing, Pathways, etc.)
Significant modification to combined QAPP/Work Plan	TL QAO and Project Manager	Don Coulombe Dave Wacker	(210) 253-7526 (210) 253-7514	Modifications to the QAPP and/or Work Plan will be communicated to the USACE ASAP (within 48 hours) via e-mail and phone.
Change in sampling location or other sampling deviation	FTL and Project Manager	Glenn Hilton/ Dave Wacker	(972) 735-7059 (210) 253-7514	FTL immediately notifies AECOM Project Manager via phone or e-mail. AECOM Project Manager notifies the USACE TOCOR as soon as possible (i.e., within 24 hours) via e-mail or phone.
Weather related change in field sampling	FTL and Project Manager	Glenn Hilton Dave Wacker	(972) 735-7059 (210) 253-7514	FTL immediately notifies AECOM Project Manager via phone or e-mail. AECOM Project Manager notifies the USACE TOCOR as soon as possible (i.e., within 24 hours) via e-mail or phone.
Laboratory related issues	Project Chemist and Project Manager	Linda Raabe Dave Wacker	(210) 253-7518 (210) 253-7514	AECOM Project Chemist notifies AECOM Project Manager and QAO within 1 business day via e-mail or phone. The USACE notified as soon as possible (i.e., within 24 hours) for any significant issues via e-mail or phone.

Notes:
AECOM AECOM Technical Services, Inc.
ASAP as soon as possible
FTL Field Team Lead
QAO Quality Assurance Officer
QAPP Quality Assurance Project Plan
TL Team Leader
TOCOR Task Order Contracting Officer Representative
USACE United States Army Corps of Engineers

WORKSHEET #7: PERSONNEL RESPONSIBILITIES AND QUALIFICATION TABLE

Name	Title	Organizational Affiliation	Responsibilities	Education and Experience Qualifications
Dave Wacker	Project Manager	AECOM	Overall Project Management	Résumé available upon request
Linda Raabe	Project Chemist	AECOM	Interface with laboratory as needed	Résumé available upon request
Glenn Hilton	FTL	AECOM	Coordinate all field activities	Résumé available upon request
Don Coulombe	Project QAO	AECOM	Overall QC	Résumé available upon request
Nash Doyle	H&S Officer	AECOM	Overall H&S	Résumé available upon request
Linda Raabe	Project Chemist	AECOM	Oversees sample analysis and compiles analytical reports	Résumé available upon request

Notes:
AECOM AECOM Technical Services, Inc.
QC quality control
FTL Field Team Leader
H&S Health and Safety

WORKSHEET #8: SPECIAL PERSONNEL TRAINING REQUIREMENTS TABLE

Specialized Training - Title or Description of Course	Training Provider	Training Date	Personnel/Groups Receiving Training	Personnel Titles/ Organizational Affiliation	Location of Training Records/Certificates
40 Hour OSHA HAZWOPER Training and 8 Hour Refresher	Varies	Varies	All field personnel	All field personnel	Available upon request
8 Hour OSHA Site Supervisor	Varies	Varies	All field personnel	All field personnel	Available upon request
First Aid/CPR	AECOM	Varies	At least one field team member	All field personnel	Available upon request
Biological Hazards	AECOM	Varies	All field personnel	All field personnel	Available upon request
Electrical Safety	AECOM	Varies	All field personnel	All field personnel	Available upon request
Fall Protection	AECOM	Varies	All field personnel	All field personnel	Available upon request
Hydrogen Sulfide	AECOM	Varies	All field personnel	All field personnel	Available upon request
Hazard Communication	AECOM	Varies	All field personnel	All field personnel	Available upon request
Respiratory Protection	AECOM	Varies	All field personnel	All field personnel	Available upon request
Yearly Physical	AECOM	Varies	All field personnel	All field personnel	Available upon request
Driver Awareness	AECOM	Varies	All field personnel	All field personnel	Available upon request
DOT Level 1	AECOM	Varies	At least one field team member	All field personnel	Available upon request

Notes:

AECOM	AECOM Technical Services, Inc.
CPR	cardiopulmonary resuscitation
DOT	Department of Transportation
HAZWOPER	Hazardous Waste Operations and Emergency Response
OSHA	Occupational Safety and Health Administration

WORKSHEET #9: PROJECT SCOPING SESSION PARTICIPANTS SHEET

Project Name: Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Texas **TOCOR:** Dave Wacker	**Site Name:** Longhorn Army Ammunition Plant **Site Location:** Karnack, Texas
Date of Session: Monthly Scoping Session Purpose:	

Name	Title	Affiliation	Phone Number	E-mail Address
Dave Wacker	Project Manager	AECOM	210-253-7514	dave.wacker@aecom.com
Gretchen McDonnell	Deputy Project Manager	AECOM	405-623-8724	gretchen.mcdonnell@aecom.com
April Palmie	TCEQ Representative	TCEQ	512-239-4152	april.palmie@tceq.texas.gov
Rose Zeiler	LHAAP Site Manager	USACE	479-635-0110	rose.zeiler@us.army.mil
Rick Smith	LHAAP Project Manager	USACE	918-669-4956	richard.p.smith@usace.army.mil
Aaron Williams	LHAAP Technical Manager	USACE	918-669-4915	aaron.k.williams@usace.army.mil
Robin Paul	ERM	USAEC	210-466-2002	robin.e.paul4.civ@mail.mil
Marilyn Plitnik	ERM	USAEC	210-424-1701	marilyn.a.plitnik.civ@mail.mil
Rich Mayer	USEPA Representative	USEPA	214-665-1442	mayer.richard@epa.gov
Paul Bruckwicki	USFWS Representative	USFWS	903-679-4536	paul_bruckwicki@fws.gov

Notes:
Actions and responsible parties are identified at each Monthly Managers Meeting, which are captured in meeting minutes that are placed in the Administrative Record.

AECOM	AECOM Technical Services, Inc.	TCEQ	Texas Commission on Environmental Quality
COR	Contracting Officer's Representative	USACE	United States Army Corps of Engineers
ERM	Environmental Resources Manager	USEPA	United States Environmental Protection Agency
LHAAP	Longhorn Army Ammunition Plant	USFWS	United States Fish and Wildlife Service

WORKSHEET #10: PROBLEM DEFINITION

LHAAP is located in central-east Texas in the northeastern corner of Harrison County. The former U.S. Army installation occupies 8,416 acres between State Highway 43 at Karnack, Texas, and the southwestern shore of Caddo Lake. The nearest cities are Marshall, Texas, approximately 14 miles to the southwest, and Shreveport, Louisiana, approximately 40 miles to the southeast. Caddo Lake, a large freshwater lake situated on the Texas-Louisiana border, bounds LHAAP to the north and east.

LHAAP became inactive and excess to the U.S. Army's needs in July 1997. Between 1998 and 2000, the Government liquidated all personal property and specific installed property. In 1999, the U.S. Army demolished several structurally unsafe buildings. The BRAC Division received administrative control of LHAAP in October 2002. The USAEC is responsible for execution and funding the Installation Restoration Program and Military Munitions Response Programs at LHAAP. The USFWS requested all of LHAAP during the federal screening for Government property disposal. In April 2004, a Memorandum of Agreement was executed between the U.S. Army and USFWS providing the terms and conditions for transfer of LHAAP property to USFWS. To date, approximately 7,000 of the 8,416-acre installation have been transferred to USFWS.

Remedial activities are planned under this project for sites LHAAP-03, LHAAP-04, LHAAP-12, LHAAP-16, LHAAP-17, LHAAP-18/24 and the GWTP, LHAAP-29, LHAAP-37, LHAAP-46, LHAAP-50, LHAAP-58, LHAAP-67, LHAAP-001-R-01, and LHAAP-003-R-01. A CERCLA 121(c) Five- Year Review will be completed for all sites in the PWS with Remedy in Place or Response Compliance. Perimeter well sampling and surface water sampling will be completed in accordance with the 1999 Dispute Resolution for an additional thirty four sites specifically identified in the PWS. LUCs will be maintained and mowing performed at LHAAP-12, LHAPP-001-R-01 and LHAAP-003-R-01, the GWTP at Site LHAAP-18/24 and the Intermediate-Range Nuclear Forces Pond (referred to as the INF Pond) will be Operated and Maintained.

The environmental questions being asked:

The below sites currently have the following environmental statements being made and questions being asked:

LHAAP-18/24

- What is the extent of volatile organic compounds (VOCs) and perchlorate contamination in the intermediate and deep zones both inside and outside the containment area?
- Determine the potential for vadose zone soil contamination and dense non-aqueous phase liquid to act as continuing sources of groundwater contamination.
- Determine the vertical gradient between water-bearing zones both inside and outside the containment area.
- Evaluate the natural attenuation potential of trichloroethylene (TCE), methylene chloride, and perchlorate.

LHAAP-37, LHAAP-46, LHAAP-50, LHAAP-58

- Observe that natural attenuation is occurring according to expectations.

- Are there any changes in the environmental conditions (e.g., geochemical, hydrogeologic, etc.) that may reduce the efficacy of any of the natural attenuation processes?
- Are there any potentially toxic and/or mobile transformation products?
- Is the plume(s) expanding?
- Has there been any unacceptable impact to down gradient receptors?
- Are there any new releases of contaminants to the environment that could impact effectiveness of the natural attenuation remedy?
- Has there been attainment of the remediation objectives?

LHAAP-58 Additional Questions

- Have removal action activities addressed shallow perchlorate and have clean-up objectives been achieved?
- Has enhanced in-situ bioremediation (EISB) effectively addressed groundwater contamination and are contamination levels trending toward the clean-up objective?

Observations from any site reconnaissance reports: NA

A synopsis of secondary data or information from site reports:

Previous investigations and remedial actions have been, and continue to be, performed by the U.S. Army and its contractors. The results indicate that environmental media have been impacted by releases from past operations and that there are several groundwater plumes at various locations at the site containing predominantly chlorinated solvents (e.g., TCE and daughter products), perchlorate, and explosives constituents (often co-mingled).

The possible classes of contaminants and the affected matrices: Perchlorate and chlorinated solvents for soil and water. Each activity has different sampling frequencies and analytical parameters depending on the site.

The rationale for inclusion of chemical and nonchemical analyses: Meet CERCLA requirements.

Information concerning various environmental indicators: NA

Project decision conditions ("If..., then..." statements): To be determined individually as planning site documents are developed and approved.

WORKSHEET #11: PROJECT QUALITY OBJECTIVE/SYSTEMATIC PLANNING PROCESS STATEMENTS

Who will use the data? The data will be used by the USEPA, the TCEQ, the U.S. Army, and the USACE.

What will the data be used for? The data will be used to determine the concentrations of contaminants at multiple sites resulting in final Remedies in Place for all sites within the LHAAP Property.

What types of data are needed? (Target analytes, analytical groups, field screening, on-site analytical or off-site laboratory techniques, sampling techniques) To accomplish the objectives of this QAPP, samples will be collected from existing site wells. Additional monitoring wells will be installed and sampled at select sites. Surface water will be sampled at various creeks, and air samples collected at the GWTP. Soil will be sampled at various locations. Samples will be sent for off-site analyses of total and dissolved TAL metals by SW-846 Methods 6020/6010, perchlorate by SW-846 Method 6850, the standard list of high explosives by SW-846 Method 8330, VOCs by SW-846 Method 8260, semi-volatile organic compounds (SVOCs) by SW846 8270D/MSS01, monitored natural attenuation (MNA) parameters, dioxin, chlorinated solvents, and air samples by TO-15.

In addition, a Trimble global positioning system (GPS) unit will be used to map the locations of newly installed monitoring wells and aid in finding existing monitoring wells.

Worksheets #12, #14, #19 and #20 of this QAPP present additional information that identifies the number of samples, field and laboratory parameters, analytical methods, recommended sample containers, matrices, holding times, and preservatives for these sampling activities.

How "good" does the data need to be in order to support the environmental decision? The data shall meet all QA/ QC criteria as defined within this document.

How much data is needed? (Number of samples for each analytical group, matrix, and concentration) Worksheet #18 of this QAPP provides this information.

Where, when, and how should the data be collected/generated? Sampling kicked off on October 8, 2012 at LHAAP 18/24 and will continue until September 30, 2017. Sites to be sampled will be determined individually as planning site documents are developed and approved. Sampling procedures can be found in Worksheet #14. Samples, once collected, will be shipped to either the Empirical Laboratories in Nashville, TN (general chemistry), ALS Environmental in Simi Valley, California (air samples), or Microbial Insights in Knoxville, Tennessee (biological samples), typically on a 10-business day or 14-calendar day turnaround analysis.

Who will collect and generate the data? All samples will be collected by AECOM personnel and/or qualified AECOM subcontractors. Empirical Laboratories will perform all analyses, with the exception of Microbial Insights in Knoxville, Tennessee who will perform dehalococcoides and functional gene analysis, and ALS Environmental in Simi Valley, California who will perform air analyses, TO-15. Empirical is the prime laboratory and will subcontract selected analyses to Microbial Insights and ALS Environmental. Empirical will supply final data for all samples analyzed by Microbial Insights and ALS Environmental.

How will the data be reported? Data will be reported after appropriate analyses and interpretations. Raw data will be reported as necessary. AECOM will transmit data to the U.S. Army per the schedule provided in Worksheet #16.

How will the data be archived? Electronic copies will be backed up and stored on disk. Paper copies will be maintained as per the USACE, Tulsa District contract requirements.

WORKSHEET #12: MEASUREMENT PERFORMANCE CRITERIA TABLE

This worksheet identifies the measurement performance criteria for QC samples collected at LHAAP. The type of QC samples, associated analytical groups, frequency, data quality indicators (DQIs), measurement performance criteria (MPC), and targeted assessment error assignment.

Programmatic Measurement Performance Criteria Table – Laboratory QC Samples

QC Sample	Analytical Group [a]	Minimum Frequency	DQIs	Measurement Performance Criteria	QC Sample Assesses Error for Sampling, Analytical or both
Temperature Blank	All	1 per sample cooler requiring preservation to 4°C	Accuracy/Bias	Temperature not to exceed >0°C or ≤6°C	Sampling & Analytical
Data Completeness Check	All	1 per laboratory	Data Completeness	85% Overall	Sampling & Analytical
Equipment/Rinsate Blanks	All	As required per sampling event	Bias/Contamination	No target analytes >1/2 LOQ for analytes of interest; with the exception of common field/laboratory contaminants	Sampling
Field Duplicate (Inorganic Constituents and Metals)	All General Chemistry	10% of total samples planned for collection for each sampling technique utilized.	Precision	Aqueous: Values > 5X LOQ: ± 50% Solids: Values > 5X LOQ: ± 75%	Sampling & Analytical
Field Duplicate (VOCs and SVOCs)	All General Chemistry	10% of total samples planned for collection for each sampling technique utilized.	Precision	Aqueous: Values > 5X LOQ: ± 25% Solids: Values > 5X LOQ: ± 50%	Sampling & Analytical
MS (Inorganic Constituents and Metals)	All General Chemistry	5% of total samples per media.	Bias	See Worksheet #15	Sampling & Analytical
MSD (Inorganic Constituents and Metals)	All General Chemistry	5% of total samples per media.	Bias	See Worksheet #15	Sampling & Analytical

QC Sample	Analytical Group [a]	Minimum Frequency	DQIs	Measurement Performance Criteria	QC Sample Assesses Error for Sampling, Analytical or both
ICV and CCV	All General Chemistry	ICV: Daily, before sample analysis CCV: After every 10 field samples and at the end of the analysis sequence	Accuracy	All analytes within 25% of expected value from the ICAL	Sampling & Analytical
Comparability Check	All General Chemistry	As required per sampling event	Comparability	Values > 5X LOQ: Field Replicates ± 50%	Sampling & Analytical
Demonstrate acceptable analyst capability	All General Chemistry	Prior to using any test method and at any time there is a significant change in instrument type, personnel, or test method	NA	QC acceptance criteria published by method-specified criteria.	Analytical
LCS containing all analytes required to be reported	All General Chemistry	One LCS and duplicate per analytical batch	Accuracy	See Worksheet #15	Analytical
Method blank	All General Chemistry	One per analytical batch	Contamination	For common laboratory contaminants, no analytes detected > LOQ specified by QSM	Sampling & Analytical
MDL study	All General Chemistry	At initial set-up and subsequently once per 12 month period; otherwise quarterly MDL verification checks shall be performed	Accuracy	See 40 CFR 136B. MDL verification checks must produce a signal at least three times the instrument noise level.	Sampling & Analytical
Minimum six-point ICAL for all analytes	All General Chemistry	Initial calibration prior to sample analysis	NA	Option 1: RSD for each analyte 20% Option 2: linear least squares regression: r 0.995 Option 3: non-linear regression: (CoD) r2 0.99 (six points used for 2nd order, seven for third order)	Analytical

QC Sample	Analytical Group [a]	Minimum Frequency	DQIs	Measurement Performance Criteria	QC Sample Assesses Error for Sampling, Analytical or both
Peak Window position establishment for each analyte and surrogate	All General Chemistry	Once per ICAL and at the beginning of the analytical shift	NA	Position shall be set such that one peak will occupy one peak window and that the bottom of the window will be on the baseline.	Sampling & Analytical
Second source calibration verification used for CCV	All General Chemistry	After every 10 field samples and at the end of the analysis sequence	Accuracy	Value of second source for all analytes within 25% of expected value (initial source)	Analytical

Notes:
[a] If information varies within an analytical group, separate by individual analyte.
QC samples and associated MPC as provided in **Worksheet #12** are applicable for all laboratory analyses intended for definitive and screening level data use.
Duplicate samples and associated MPC as provided in **Worksheet #12** are applicable for onsite field analyses intended for screening level data, excluding field measurements (e.g., water quality parameters) in support of definitive sample data collection.
Minimum frequency, DQI and measurement performance criteria apply to concentrated levels (low, mid and high).
All General Chemistry includes the following analysis for groundwater: Anions, Metals, Alkalinity, Explosives, VOCs and SVOCs.

%	percent	MS	matrix spike
°C	degrees Celsius	MSD	matrix spike duplicate
CCV	continuing calibration verification	NA	not applicable
CFR	Code of Federal Regulation	QC	quality control
CoD	coefficient of determination	QSM	Quality Systems Manual
DoD	United States Department of Defense	RPD	relative percent difference
DQI	data quality indicator	RSD	relative standard deviation
ICAL	initial calibration	SVOC	semi- volatile organic compound
ICV	initial calibration verification	VOC	volatile organic compound
LCS	laboratory control sample		
LOQ	limit of quantitation		
MDL	method detection limit		
MPC	measurement performance criteria		

12.1 Equipment Rinsate Blanks

An equipment rinsate blank (i.e., "decontamination rinsate" or "equipment rinsate") sample consists of a sample of analyte free source water poured/pumped over or through decontaminated field sampling equipment that is considered ready to collect or process an additional sample. Equipment rinsate blanks are to be collected from non-dedicated sampling equipment to assess the adequacy of the decontamination process. Typically, retail distilled water will be utilized for rinsate blank source water. If laboratory-grade deionized source water is required for a particular application, the water certification results should be evaluated against the project-specific action levels and quantitation limits to ensure the water contains no analytes above these criteria.

To collect an equipment rinsate blank sample, pump or pour the source water over and/or through the decontaminated sampling equipment. For pumps, source water must be pumped through the pump body and any associated tubing. Collect this runoff water into the sample containers directly or with the use of a funnel, if necessary. The source water may be poured by use of an electric or hand submersible pump by tipping the jug of water upside down or by use of a stopcock and gravity. Results of equipment rinsate blank samples are used to evaluate whether equipment decontamination was effective.

At a minimum, equipment rinsate blank samples should be collected at a rate of one per each week of sampling. This rate may be adjusted depending on the nature of the investigation (site inspection, remedial investigation, remedial site evaluation, long-term monitoring) and the associated project quality objectives. The equipment rinsate blanks samples will be analyzed for the same parameters as the field samples that were collected using that piece of equipment. If analytes pertinent to the project are found in the equipment rinsate blanks, the frequency of equipment rinsate blank samples may be increased after decontamination procedures have been modified to further evaluate the effectiveness of the decontamination procedure. Equipment blanks should not contain any detections greater that ½ of the limit of quantitation (LOQ) for analytes of interest. Detections in the equipment blank and their possible impacts to the investigation are evaluated on a project-specific basis.

When disposable or dedicated sampling equipment is utilized, equipment rinsate blank samples do not need to be collected.

12.2 Temperature Blank

A temperature blank is a container of water that is packed and shipped with the field samples requiring preservation by cooling to 4°C (degrees Celsius) to the laboratory. Upon arrival at the laboratory, the laboratory measures the temperature of the blank. This temperature reading is used to represent the conditions of the field samples during shipment to the laboratory. This information is used by both the laboratory and by the independent data validator. If temperature blank exceeds criteria of less than 0°C or greater than 6°C, the laboratory must notify the PM or Project Chemist immediately for guidance. No temperature blank is necessary for waste samples since waste samples do not require ice for preservation.

12.3 Field Duplicates

A field duplicate is a generic term for two or more field samples taken at the same time in the same location. They are intended to represent the same population and are taken through all steps of the analytical preparation and analysis process in an identical manner and provide precision information for the data collection activity. Field duplicates for groundwater are generally considered to be co-locates.

Duplicates will be analyzed for the same analytical parameters as their associated parent sample. Field duplicates are generally collected at a frequency of 10 percent. Evaluation of field duplicate results is performed by calculating the relative percent difference (RPD) between the parent sample and its field duplicate for every analyte of interest and matrix. The acceptance criteria for analyte specific RPDs are developed during the DQO development process on a project-specific basis, and are provided in Worksheet 15.

12.4 Analytical Method Blank

The analytical method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as used in sample processing and is carried through the complete sample preparation and analytical process. The purpose of this sample is to document contamination resulting from the analytical process. A method blank shall be included in every analytical batch.

The detection of analytes in a method blank must not exceed ½ the limit of quantitation (LOQ). Corrective action shall be performed to eliminate the source of contamination prior to proceeding with analysis. After the source of contamination has been eliminated, all samples in the preparation batch shall be re-prepared and re-analyzed. Analytical data are not corrected for the presence of analytes in blanks. When an analyte is detected in the method blank and in the associated samples and corrective actions are not performed or are ineffective, the appropriate validation qualifier shall be applied to the sample results.

12.5 Laboratory Control Sample/Laboratory Control Sample Duplicate

The laboratory control sample/laboratory control sample duplicates (LCS/LCSDs) are analyte-free water (for aqueous analyses) or reagents and glassware only (for soil analysis) spiked with all target analytes of interest for each analytical method. The LCS/LCSD is analyzed to assess general method performance by the laboratory's ability to recover analytes from a control matrix. The spiking level must be greater than the lowest concentration standard used for calibration and less than or equal to the midpoint of the linear range calibrated. The LCS/LCSD results are evaluated in conjunction with other related QC information to determine the acceptability of the data generated for the associated samples.

The LCS/LCSD shall be carried through the complete sample preparation and analysis process. The LCS/LCSD cannot be used as the continuing calibration verification. One LCS/LCSD shall be included in every analytical batch. The performance of the LCS/LCSD is evaluated against the QC acceptance limits provided in the DoD Quality Systems Manual (QSM), Version 4.2. This evaluation shall also include the use of control charts for establishing the internal lab limits and for identifying non-conformances.

Whenever an analyte in an LCS/LCSD is outside the acceptance limit, corrective action shall be performed. After the system problems have been resolved and system control has been reestablished, all samples in the analytical batch shall be reanalyzed for only the out-of-control analyte(s). When an analyte in a LCS/LCSD exceeds the upper or lower control limit and no corrective action is performed or the corrective action was ineffective, the appropriate validation qualifier will be applied to all affected results.

12.6 Matrix Spikes/Matrix Spike Duplicates

The MS is used to access the performance of the method as applied to a particular matrix. Matrix spikes (MSs) and matrix spike duplicates (MSDs) are aliquots of samples spiked with known amounts of all target analytes. The spiking occurs in the laboratory, prior to sample preparation and analysis. The spiking level must be greater than the lowest concentration standard used for calibration and less than or equal to the midpoint of the linear range calibration.

A minimum of one MS sample and one MSD sample shall be collected per 20 site samples per media collected. Sampling locations selected for the purpose of assigning a MS/MSD should be an area anticipated to be free from or have low concentrations of targeted analytes. Wells containing free product or having a history of high concentrations of targeted analytes should be avoided for MS/MSD.

Only project-specific samples shall be used for spiking. The MS/MSD is designated on the chain-of-custody (COC). The MS/MSD is used to document the bias of a method due to sample matrix. These sample results are not to be used to control the analytical process. The acceptance criteria for the MS and MSD are evaluated against the QC acceptance limits developed during the DQO development process. If performance criteria are not being met by the MS and MSD samples, the analytical procedures and methods must be re-evaluated for appropriateness and correctness. For example, clean-up procedures may be needed to remove matrix interferences.

12.7 Surrogate Spikes

Surrogates are organic compounds that are similar to the target analyte(s) in chemical structure and chemical behavior in the analytical process, but that are not normally found in environmental samples. The surrogate results are used to evaluate accuracy, method performance, and extraction efficiency. These surrogate compounds are spiked in environmental samples, control samples, and blank samples per the method requirements. The surrogate should be spiked at a concentration less than or equal to the midpoint of the linear range calibrated.

When the acceptance criteria of a surrogate recovery are not met, corrective action must be performed. Once the system problems have been resolved and system control has been reestablished, the sample is re-prepared and re-analyzed. If corrective actions are not performed or are ineffective, the appropriate validation qualifier shall be applied to the sample results.

12.8 Internal Standards

Internal standards (ISs) are known amounts of certain compounds added after preparation or extraction of a sample. These compounds are used in an IS calibration method to correct sample results affected by column injection losses, purging losses, or viscosity effects. ISs shall be added to environmental samples, control samples, and blanks in accordance with the method requirements.

When the IS results are outside of the acceptance limits, corrective actions shall be performed. After the system problems have been resolved and system control has been reestablished, all samples analyzed while the system was malfunctioning shall be reanalyzed. If corrective actions are not performed or are ineffective, the appropriate validation qualifier shall be applied to the sample results.

12.9 Retention Time Windows

Retention time windows are used in gas chromatograph (GC) and high performance liquid chromatography (HPLC) analysis for qualitative identification of analytes. They are calculated from replicate analyses of a standard on multiple days. The procedure and calculation method are given in SW-846 Method 8000C.

Retention time windows are established to compensate for minor shifts in absolute retention times resulting from normal chromatographic variability. Absolute retention times are used for analyte identification in all GC and HPLC methods that do not employ IS calibration.

When the retention time is outside of the acceptance limits, new chromatographic columns are installed or significant changes are made to the operating conditions, new retention time windows must be re-established. After the system problems have been resolved and system control has been reestablished, reanalyze all samples analyzed since the last acceptable retention time check.

12.10 Interference Check Sample

The interference check sample (ICS), used in inductively coupled plasma analyses only, contains both interfering and analyte elements of known concentrations. The ICS is used to verify background and inter-element correction factors and is run at the beginning and end of each run sequence.

When the ICS results are outside of the acceptance limits as prescribed in the method, corrective action shall be performed. After the system problems have been resolved and system control has been re-established, re-analyze the ICS. If the ICS result is acceptable, re-analyze all affected samples. If corrective action is not performed or the corrective action was ineffective, the appropriate validation qualifier shall be applied to all affected results.

12.11 Data Quality Criteria

QC procedures are employed during chemical analysis to support and document the attainment of established method quality objectives. Whether these QC procedures support an assessment of general batch control or matrix-specific application, documentation includes calculating DQIs to verify data usability and contract compliance. DQIs were formerly referred to as the parameters of precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). Acceptance criteria for PARCCS are developed during project-specific scoping sessions during the DQO development process. The basis for assessing each of these elements of data quality is discussed in the following subsections.

12.11.1 Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves. Precision is usually expressed as standard deviation, variance, percent difference, or range, in either absolute or relative terms. Precision data indicate how consistent and reproducible the field sampling or analytical procedures have been. Project-specific acceptance criteria can be found in Worksheet 12. Field duplicate precision is evaluated by calculating a RPD using the following equation:

$$RPD = |(D1-D2)/\{1/2(D1+D2)\}| \text{ X } 100$$

Where:

D1 = original sample concentration

D2 = duplicate sample concentration

If more than two field duplicate samples are collected from adjacent locations and analyzed, they are referred to as co-located field replicates. If two or more aliquots of the same sample are prepared and analyzed by the laboratory, these are referred to as laboratory replicates. Precision of replicate samples is evaluated by calculating the relative standard deviation (RSD) using the following equation:

$$\%RSD = \frac{\sqrt{\frac{\sum_{i=1}^{i=n}\left|D_i - \overline{D}\right|^2}{n}}}{\overline{D}}$$

Where:

D_i = the individual sample concentrations

D = the mean of n values

n = the total number of values

Possible causes of poor precision include sample heterogeneity, improper sample collection or handling, inconsistent sample preparation, and poor instrument stability.

12.11.2 Accuracy

Accuracy is the degree of agreement of a measurement, or average of measurements, with an accepted reference or "true" value, and is a measure of bias in the system. Accuracy of measurement data will be assessed and controlled through the use of LCSs and laboratory control sample duplicates (LCSDs), surrogate spikes and site-specific MSs and MSDs.

Results for LCS and surrogate spikes will be the primary indicators of accuracy. These results will be used to control accuracy within acceptable limits for definitive-level data. Field-designated MS/MSD samples will be employed for applicable methods to identify matrix-associated analytical influences or interferences that may affect the accuracy of the analytical data. As spiked samples are analyzed, spike recoveries will be calculated and compared to pre-established acceptance limits.

Accuracy/bias is:

$$MS\ \%\ recovery\ = \frac{concentration\ of\ \ sample\ \ plus\ spike - concentration\ of\ \ unspiked\ \ sample}{value\ of\ \ spike\ added}\ x\ 100$$

$$LCS\ target/surrogate\ \%\ recovery = \frac{measured\ \ concentration}{true\ (expected)\ concentration}\ x\ 100$$

Triplicate blanks, field blanks, and equipment blanks monitor accuracy/bias by detecting any concentrations of analytes in water that was originally contaminant-free and comparing that to the field sample results.

12.11.3 Completeness

Completeness is a measure of the amount of adequate data obtained from the actual performance of measurement procedures compared to the amount expected to be obtained from error-free performance of the same measurement procedures under normal conditions. Completeness measures the extent to which the database resulting from a measurement effort fulfills objectives for the amount of data required. Completeness is defined as the valid data percentage of the total tests requested.

$$Completeness\ (\%) = \frac{number\ of\ valid\ analyses\ per\ analyte\ in\ a\ matrix}{number\ of\ requested\ analyses\ per\ analyte\ for\ that\ matrix} x\,100$$

Complete project data involves both satisfactory performance and documentation of field and laboratory procedures. Valid analyses are defined as those where the sample arrives at the laboratory intact, properly preserved, in sufficient quantity to perform the requested analyses, and accompanied by a completed COC. Furthermore, the sample must be analyzed within the specified holding time and in such a manner that analytical QC acceptance criteria are met, with the following exception. Data qualified as estimated as a result of data validation are considered valid and counted towards completeness if still usable for the intended use of the data. Such data require evaluation to determine suitability for decision-making purposes. Rejected data are not valid data. Completeness for the entire project also involves completeness of field and laboratory documentation, whether all samples and analyses specified in the project-specific QAPP have been processed, and whether the procedures specified in the applicable laboratory Standard Operating Procedures (SOPs) have been followed.

The completeness goal for a project as a whole is 90 percent. The completeness goal is for the entire duration of the project (e.g., there is not a goal of 90 percent completeness per sampling round). The completeness goal for the analytical laboratory portion for each project is 95 percent. Site-specific completeness goals may be necessary to support various environmental cleanup or No Further Action decisions. Failure to achieve the project completeness goal may necessitate re-sampling and reanalysis, or re-evaluation of DQOs.

Critical samples are samples that are used as the sole or primary source for making environmental decisions. These samples require a high level of data quality and completeness. Critical samples will have a completeness goal of 100 percent for each analyte of concern in each matrix, and the completeness goal will be evaluated based on each sampling round, this will be documented in the Quality Control Summary Report (QCSR). Should recollection efforts be necessary to attain completeness objectives, appropriate PMs and regulatory parties will assess budgetary, site access, schedule, or other constraints, and their impact to the decision-making process.

12.11.4 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition.

The characteristics of representativeness are usually not quantifiable. Subjective factors to be considered in evaluating how representative a set of measurement data is of a property being measured include:

- Degree of homogeneity of the property or environmental matrices across a site;
- Consistency in applying field procedures;

- Degree of homogeneity of the property within a sample collected from one location at a site; and
- Available information on which a sampling plan is based.

To maximize representativeness of the data, sampling techniques, sample size, and sample locations are carefully chosen to yield samples representative of the particular location and time of sampling, and to produce samples that are collectively representative of the site as a whole. Properly installed monitoring wells verify that the groundwater being sampled originates from the aquifer of interest. Care must be taken to verify proper stabilization of measured water parameters, clarity, and color before groundwater samples are collected. Precautions, such as not operating combustion engines near a well during sampling, must be taken to prevent the introduction of extraneous analytes into environmental samples.

12.11.5 Comparability

Comparability is the degree to which one data set can be compared to another data set measuring the same property. Comparability is assured through the use of established and approved sample collection techniques and analytical methods, consistency in the basis of analysis (volume, etc.), consistency in reporting units, and analysis of standard reference materials.

Data comparability will be achieved by using standard units of measure, e.g., milligrams per liter (mg/L) for metals and other inorganics in water samples, micrograms per liter (µg/L) for organics in water. Radioactivity will be reported in picocuries per liter (pCi/L) in water samples. The use of approved or standard methods to collect and analyze samples (in this case American Society of Testing Materials and USEPA Methods), along with instruments calibrated against National Institute for Standards and Technology traceable standards will also help maintain comparability.

Comparability also depends on the other data quality characteristics. Only when data are judged to be representative of the environmental conditions, and when precision and accuracy are known, may data sets be compared with confidence.

12.11.6 Sensitivity

Sensitivity is the ability of an analytical method or instrument to discriminate between measurement responses representing different concentrations. This capability is established during the planning phase to meet project-specific objectives. It is important to be able to detect the target analytes at the levels of interest. Sensitivity requirements include the establishment of various limits, which are described in the project-specific QAPP, such as calibration requirements, instrument detection limits (IDLs), LODs, LOQs, and project quantitation limits. The IDLs, LODs, and LOQs are based on an interference-free matrix (i.e., reagent water), which do not take into account matrix effects and may not be achievable for all environmental samples.

12.11.7 Application of Data Qualifiers

If corrective actions are not performed or are not effective, the laboratory will apply an initial appropriate flag to the sample result to advise the data use of the uncertainty in the result. The data validator will apply the final qualifier based on consideration of all data and project objectives.

WORKSHEET #13: SECONDARY DATA CRITERIA AND LIMITATIONS TABLE

Secondary Data	Data Source (Originating Organization, Report Title, and Date)	Data Generator (Originating Organization, Data Types, Data Generation/ Collection Dates)	How Data Will Be Used	Limitations on Data Use
Previous investigations determined that environmental media have been impacted by releases from past operations.	Admin Record	U.S. Army	Background information	None

Notes:
U.S. Army United States Department of the Army

WORKSHEET #14: SUMMARY OF PROJECT TASKS

Sampling Tasks: All samples for general chemistry analysis will be sent to Empirical Laboratories in Nashville, TN. Air samples will be sent to ALS Environmental in Simi Valley, California. Samples for dehalococcoides and functional gene analysis will be sent to Microbial Insights in Knoxville, Tennessee. Samples will be processed with a 10 day turnaround time, unless an otherwise shorter turnaround time is requested. The following is a list of SOPs that will be used while completing project tasks:

- *Collection and Field Screening of Soil Samples:* See Installation-Wide Work Plan (IWWP) Appendix C, Attachment 1
- *Groundwater Sampling:* See IWWP Appendix C, Attachment 2
- *Monitoring Well Development:* See IWWP Appendix C, Attachment 3
- *Subsurface Soil Sampling by Split Spoon:* See IWWP Appendix C, Attachment 5
- *Surface Soil Sampling:* See IWWP Appendix C, Attachment 6
- *Surface Water Sampling:* See IWWP Appendix C, Attachment 7
- *Packaging and Shipment of Environmental Samples:* See IWWP Appendix C, Attachment 8
- *Decontamination of Field Equipment:* See IWWP Appendix C, Attachment 9
- *Investigation Derived Waste:* See IWWP Appendix C, Attachment 10
- *Air Sampling:* See IWWP Appendix C, Attachment 21
- *Quality Assurance Samples:* QA samples will be obtained in the field as follows: field duplicate sample(s), additional volume for laboratory QC analysis (i.e., MS/MSD), and equipment rinsate blank(s).

Analysis Tasks: The following analytes and methods are expected:

- Total and dissolved TAL metals by SW-846 Methods 6020/6010
- Perchlorate by SW-846 Method 6850,
- Standard list of high explosives by SW-846 Method 8330
- VOCs by SW-846 Method 8260,
- SVOCs by SW-846 8270D,
- MNA parameters, to include TOC, common anions, ferrous iron, dissolved gases (methane, ethane, ethene), alkalinity, sulfide, total phosphorus
- Hexavalent chromium by SW7196A
- Dehalococcoides functional genes, dehalobactor and compound specific isotopes for TCE and TCE and VC reductase
- Volatile air samples by TO-15.

Survey Requirements for Wells: The field team will survey the monitoring wells using a GPS. Horizontal Coordinates will be recorded in Texas Plane System (North Central Zone, NAD83 and NADV88) and expressed in U.S. feet. Monitoring wells will be surveyed with a horizontal accuracy of five feet.

QC Tasks: The following types of QC samples will be analyzed as necessary: field duplicates, MS/MSD, and rinsate blanks. Field blanks for VOC analysis will be collected and analyzed when ambient conditions warrant.

All samples will be sent to the laboratory in well-sealed containers, and packaged and labeled in accordance with Department of Transportation and International Air Transport Association requirements. A temperature blank will be placed in each shipping container and sufficient ice will be added to the samples to maintain a temperature of 4°C ±2°C, but not to the point of freezing. Custody seals will be used as appropriate in accordance with the packaging requirements. All applicable shipping regulations will be observed. The containers, preservation technique, and holding times for each analytical parameter are summarized in Worksheet #19.

Secondary Data: See Worksheet #13.

Data Management Tasks: Analytical data will be provided by the laboratory electronically and will be summarized in analytical data tables by AECOM. If manual entry of data is necessary, a secondary review of data entered into the tables will be performed for verification purposes. A trip report documenting the overall activities that occurred during field operations will be submitted to the U.S. Army. This may include, but is not limited to, (COC) documentation, photographs, a site map, completed field forms and written field notes (i.e., logbook) taken during the sampling event. Field documentation will be provided to EPA and TCEQ, typically as report appendices.

- *Documentation and Records*: All field measurements and records for each sample collected will be documented in the field log book, boring log, or sampling record sheet. Due to the evidentiary nature of samples collected, possession must be traceable from the time the samples are collected until their derived data is introduced as evidence in legal proceedings. To ensure that samples are secure from tampering, COC documentation is utilized to provide a traceable record of sample custody (see AECOM's IWWP Appendix C, Attachment 8, Packaging and Shipment of Environmental Samples, for additional information). Field records will be maintained in the field logbooks. The type of information that will be entered into the logbook should include, but is not limited to the items listed below.
    - Site name
    - Site identification number, if applicable
    - Name and signature to whom the book was issued
    - Reference to the USEPA/TCEQ-approved document (e.g., work plan, sampling plan, QAPP) describing the proposed field activities which are subsequently documented in the logbook
    - Any deviation(s) from the USEPA/TCEQ-approved document (e.g., work plan, sampling plan, QAPP) and the rationale for the deviation(s)

- Dates and times of site entries and departures
- Names of USEPA/TCEQ representatives on-site
- Names, organizations, addresses, and telephone numbers of persons on-site
- Type(s) of monitoring equipment brought on-site (including identification numbers) and calibration data
- Types of sampling equipment (including filters, tools, syringes) and sampling method
- Any equipment failures and steps taken to repair/replace equipment
- Subjects of discussion between USEPA/TCEQ representatives and facility/site representatives or other parties
- Field conditions and site observations (e.g., weather, slopes, visual waste characteristics, stream-flow information, etc.)
- Sketches of site conditions
- Description of activities
- In situ measurements
- Lists of photographs taken including time, date, location, picture number, name of the person taking the picture, and sketches of photo locations
- A brief summary of well development activities shall be presented which highlight any noted site abnormalities or work difficulties
- Records of all sample documentation
- Descriptions of all sampling activities including visual observations and physical measurements. For sampling activities, the following information should be recorded, either in the field logbook or on an appropriate data sheet or other appropriate method (e.g., photographs):

    a. Date and time of measurement or sample collection

    b. Location description and/or global positioning system (GPS) coordinates

    c. Measurement/Sample identification

    d. Measurement/Sample collection method

    e. Measurement/Sample collection equipment used, including identification numbers and the manufacturer name/model number, as appropriate

    f. Calibration standards, buffers, etc. including manufacturer, lot numbers, and expiration date

    g. Initial and continual calibration data and meter end checks

    h. Measurement values for non-logging equipment

    i. Sample containers (number and type)

    j. Sample preservation (chemical, ice, etc.)

    k. Physical description of matrix measured or sampled

    l. Maps/sketches

m. Conditions that may adversely impact the quality of measurements/samples, if applicable (for example, rain, wind, smoke, dust, extreme temperatures, etc.)
n. Photograph log.:

- *Field Custody:* The sampling team members are responsible for the care and custody of the samples collected until they are properly transferred to the shipping company or laboratory. In addition, the sampling team members will ensure that samples are collected, maintained, and transferred in accordance with approved SOPs and COC requirements as follows: Collect only the number of samples needed to represent the media being sampled. To the extent possible, determine the quantity, types of samples, and sample locations prior to the actual fieldwork. As few people as possible should handle samples. Sample labels will be completed for each sample, using waterproof ink. Custody will be maintained in the field by ensuring the samples are accompanied by the COC documentation and are kept in a cooler that is within the line of sight or in a locked storage location from the time of collection until relinquished by signature and physical custody to the shipper.
- *Sample Numbering Scheme:* Samples will be recorded in the field logbook or sampling record sheet. Monitoring well samples will be labeled using the respective well identifier for each existing monitoring well.

QC samples will be identified using the following designations:

EB = equipment rinsate blank

MS/MSD = will be designated in the comments column on the COC

D = duplicate

Assessment/Audit Tasks: This QAPP will be reviewed during the course of sampling to ensure consistency and to account for any changes in the plan that needs to be documented.

Data Review Tasks: Data will be reviewed within the context of specific project and sampling objectives. Data will be placed into tables, charts, and graphs as necessary for data review and interpretations.

WORKSHEET #15: REPORTING LIMITS AND EVALUATION TABLE

Matrix: Aqueous
Analytical Group: VOC
Method: 8260

Analyte	CAS Number	MAL µg/L	MCL µg/L	TCEQ GW-Ind MSC µg/L	LOQ µg/L	LOD µg/L	DL µg/L	LCL (%)	UCL (%)	RPD (%)
1,1,1,2-Tetrachloroethane	630-20-6			110	1.00	0.50	0.25	80	130	30
1,1,1-Trichloroethane (1,1,1-TCA)	71-55-6	10	200	200	1.00	0.50	0.25	65	130	30
1,1,2,2-Tetrachloroethane	79-34-5			14	1.00	0.50	0.25	65	130	30
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113; Freon 113)	76-13-1			3100000	2.00	1.00	0.50	60	130	30
1,1,2-Trichloroethane	79-00-5	10	5	5	1.00	0.50	0.25	70	135	30
1,1-Dichloroethane (1,1-DCA)	75-34-3	10		10000	1.00	0.50	0.25	70	130	30
1,1-Dichloroethene (1,1-DCE)	75-35-4	10	7	7	1.00	0.50	0.25	75	130	30
1,1-Dichloropropene	563-58-6			2.9	2.00	1.00	0.50	55	140	30
1,2,3-Trichlorobenzene	87-61-6			310	2.00	1.00	0.50	75	125	30
1,2,3-Trichloropropane	96-18-4			0.041	2.00	1.00	0.50	65	135	30
1,2,4-Trichlorobenzene	120-82-1		70	70	1.00	0.50	0.25	75	130	30
1,2,4-Trimethylbenzene	95-63-6			5100	2.00	1.00	0.50	50	130	30
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8		0.2	0.2	1.00	0.50	0.25	80	120	30
1,2-Dibromoethane (EDB)	106-93-4			0.05	1.00	0.50	0.25	70	120	30
1,2-Dichlorobenzene (12DCB)	95-50-1		600	600	1.00	0.50	0.25	70	130	30
1,2-Dichloroethane (EDC)	107-06-2	10	5	5	1.00	0.50	0.25	75	125	30
1,2-Dichloropropane	78-87-5		5	5	1.00	0.50	0.25	75	130	30
1,3,5-Trimethylbenzene	108-67-8			5100	1.00	0.50	0.25	75	125	30
1,3-Dichlorobenzene (13DCB)	541-73-1			3100	1.00	0.50	0.25	75	125	30
1,3-Dichloropropane	142-28-9			29	1.00	0.50	0.25	75	125	30
1,4-Dichlorobenzene (14DCB)	106-46-7		75	75	1.00	0.50	0.25	70	135	30
2,2-Dichloropropane	594-20-7			42	10.0	5.00	2.50	30	150	30
2-Butanone (Methyl ethyl ketone; MEK)	78-93-3			61000	1.00	0.50	0.25	75	125	30
2-Chlorotoluene	95-49-8			2000	5.00	2.50	1.25	55	130	30
2-Hexanone (Methyl butyl ketone; MBK)	591-78-6			6100	1.00	0.50	0.25	75	130	30
4-Chlorotoluene	106-34-4			2000	5.00	2.50	1.25	60	135	30
4-Methyl-2-pentanone (Methyl isobutyl ketone; MIBK)	108-10-1			8200	10.0	5.00	2.50	40	140	30
Acetone	67-64-1			92000	1.00	0.50	0.25	80	120	30

Analyte	CAS Number	MAL µg/L	MCL µg/L	TCEQ GW-Ind MSC µg/L	LOQ µg/L	LOD µg/L	DL µg/L	LCL (%)	UCL (%)	RPD (%)
Benzene	71-43-2	10	5	5	1.00	0.50	0.25	75	125	30
Bromobenzene	108-86-1			2000	1.00	0.50	0.25	65	130	30
Bromochloromethane	74-97-5			4100	1.00	0.50	0.25	75	120	30
Bromodichloromethane (Dibromochloromethane)	75-27-4			4.6	1.00	0.50	0.25	70	130	30
Bromoform	75-25-2			36	2.00	1.00	0.50	30	145	30
Bromomethane (methyl bromide)	74-83-9			140	1.00	0.50	0.25	35	160	30
Carbon Disulfide	75-15-0			10000	1.00	0.50	0.25	65	140	30
Carbon Tetrachloride	56-23-5	10	5	5	1.00	0.50	0.25	80	120	30
Chlorobenzene	108-90-7	50	100	100	2.00	1.00	0.50	60	135	30
Chloroethane	75-00-3			41000	1.00	0.50	0.25	65	135	30
Chloroform	67-66-3	10		1000	1.00	0.50	0.25	40	125	30
Chloromethane (methyl chloride)	74-87-3			220	1.00	0.50	0.25	70	125	30
cis-1,2-Dichloroethene (cis-1,2-DCE)	156-59-2		70	70	1.00	0.50	0.25	70	130	30
cis-1,3-Dichloropropene	10061-01-5			5.3	1.00	0.50	0.25	60	135	30
Dibromochloromethane (Chlorodibromomethane)	124-48-1			34	1.00	0.50	0.25	75	125	30
Dibromomethane	74-95-3			380	2.00	1.00	0.50	30	155	30
Dichlorodifluoromethane (CFC-12)	75-71-8			20000	1.00	0.50	0.25	75	125	30
Ethylbenzene	100-41-4	10	700	700	2.00	1.00	0.50	50	140	30
Hexachlorobutadiene (HCBD)	87-68-3			20	1.00	0.50	0.25	75	125	30
Isopropylbenzene (Cumene)	98-82-8			10000	2.00	1.00	0.50	75	130	30
m,p-Xylene	108-38-3/ 106-42-3			10000	2.00	1.00	0.50	55	140	30
Methylene Chloride, or Dichloromethane	75-09-2	20	5	5	2.00	1.00	0.50	55	140	30
Naphthalene	91-20-3			2000	1.00	0.50	0.25	70	135	30
n-Butylbenzene	104-51-8			4100	1.00	0.50	0.25	70	130	30
n-Propylbenzene	103-65-1			4100	1.00	0.50	0.25	80	120	30
o-Xylene	95-47-6			10000	1.00	0.50	0.25	75	130	30
p-Isopropyltoluene	99-87-6			10000	1.00	0.50	0.25	70	125	30
sec-Butylbenzene	135-98-8			4100	1.00	0.50	0.25	65	135	30
Styrene	100-42-5		100	100	1.00	0.50	0.25	70	130	30
tert-Butylbenzene	98-06-6			4100	1.00	0.50	0.25	45	150	30
Tetrachloroethene (PCE; PERC)	127-18-4	10	5	5	1.00	0.50	0.25	75	120	30
Toluene	108-88-3	10	1000	1000	1.00	0.50	0.25	60	140	30

Analyte	CAS Number	MAL µg/L	MCL µg/L	TCEQ GW-Ind MSC µg/L	LOQ µg/L	LOD µg/L	DL µg/L	LCL (%)	UCL (%)	RPD (%)
trans-1,2-Dichloroethene (trans-1,2-DCE)	156-60-5		100	100	1.00	0.50	0.25	55	140	30
trans-1,3-Dichloropropene	10061-02-6			29	1.00	0.50	0.25	70	125	30
Trichloroethene (TCE)	79-01-6		5	5	2.00	1.00	0.50	60	145	30
Trichlorofluoromethane (CFC-11)	75-69-4			31000	1.00	0.50	0.25	50	145	30
Vinyl Chloride (VC)	75-01-4	10	2	2	30	0.50	0.25	70	120	
1,2-Dichloroethane-d4 (Surrogate)	17060-07-0							75	120	
Bromofluorobenzene (Surrogate)	460-00-4							85	115	
Dibromofluoromethane (Surrogate)	1868-53-7							85	120	
Toluene-d8 (Surrogate)	2037-26-5							85	120	

Notes:

Bold italicized numbers indicate value greater than the applicable regulatory standard.

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental
LOQ	limit of quantitation	UCL	upper control limit
MAL	minimum analytical level	VOC	volatile organic compound

Matrix: Solid
Analytical Group: VOC
Method: 8260

Analyte	CAS Number	TCEQ GWP-Ind MSC µg/kg	LOQ µg/kg	LOD µg/kg	DL µg/kg	LCL (%)	UCL (%)	RPD (%)
1,1,1,2-Tetrachloroethane	630-20-6	11000	5	2.5	1.25	75	125	20
1,1,1-Trichloroethane (1,1,1-TCA)	71-55-6	20000	5	2.5	1.25	70	135	30
1,1,2,2-Tetrachloroethane	79-34-5	1400	5	2.5	1.25	55	130	30
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113; Freon 113)	76-13-1	31000000	10	5	2.5	20	185	30
1,1,2-Trichloroethane	79-00-5	500	5	2.5	1.25	60	125	30
1,1-Dichloroethane (1,1-DCA)	75-34-3	1000000	5	2.5	1.25	75	125	30
1,1-Dichloroethene (1,1-DCE)	75-35-4	700	5	2.5	1.25	65	135	30
1,1-Dichloropropene	563-58-6	290	5	2.5	1.25	70	135	30
1,2,3-Trichlorobenzene	87-61-6	31000	5	2.5	1.25	60	130	30
1,2,3-Trichloropropane	96-18-4	4.1	5	2.5	1.25	65	130	30
1,2,4-Trichlorobenzene	120-82-1	7000	5	2.5	1.25	65	130	30
1,2,4-Trimethylbenzene	95-63-6	510000	5	2.5	1.25	65	135	30
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	20	10	5	2.5	40	135	30
1,2-Dibromoethane (EDB)	106-93-4	5	5	2.5	1.25	70	125	30
1,2-Dichlorobenzene (12DCB)	95-50-1	60000	5	2.5	1.25	75	120	30
1,2-Dichloroethane (EDC)	107-06-2	500	5	2.5	1.25	70	135	30
1,2-Dichloropropane	78-87-5	500	5	2.5	1.25	70	120	30
1,3,5-Trimethylbenzene	108-67-8	510000	5	2.5	1.25	65	135	30
1,3-Dichlorobenzene (13DCB)	541-73-1	310000	5	2.5	1.25	70	125	30
1,3-Dichloropropane	142-28-9	2900	5	2.5	1.25	75	125	30
1,4-Dichlorobenzene (14DCB)	106-46-7	7500	5	2.5	1.25	70	125	30
2,2-Dichloropropane	594-20-7	4200	5	2.5	1.25	65	135	30
2-Butanone (Methyl ethyl ketone; MEK)	78-93-3	6100000	10	5	2.5	30	160	30
2-Chlorotoluene	95-49-8	200000	5	2.5	1.25	70	130	30
2-Hexanone (Methyl butyl ketone; MBK)	591-78-6	610000	10	5	2.5	45	145	30
4-Chlorotoluene	106-43-4	200000	5	2.5	1.25	75	125	30
4-Methyl-2-pentanone (Methyl isobutyl ketone; MIBK)	108-10-1	820000	10	5	2.5	45	145	30
Acetone	67-64-1	9200000	20	10	5	20	160	30
Benzene	71-43-2	500	5	2.5	1.25	75	125	30
Bromobenzene	108-86-1	200000	5	2.5	1.25	65	120	30

Analyte	CAS Number	TCEQ GWP-Ind MSC µg/kg	LOQ µg/kg	LOD µg/kg	DL µg/kg	LCL (%)	UCL (%)	RPD (%)
Bromochloromethane	74-97-5	410000	5	2.5	1.25	70	125	30
Bromodichloromethane (Dibromochloromethane)	75-27-4	460	5	2.5	1.25	70	130	30
Bromoform	75-25-2	3600	5	2.5	1.25	55	135	30
Bromomethane (methyl bromide)	74-83-9	14000	10	5	2.5	30	160	30
Carbon Disulfide	75-15-0	1000000	5	2.5	1.25	45	160	30
Carbon Tetrachloride	56-23-5	500	5	2.5	1.25	65	135	30
Chlorobenzene	108-90-7	10000	5	2.5	1.25	75	125	30
Chloroethane	75-00-3	4100000	10	5	2.5	40	155	30
Chloroform	67-66-3	100000	5	2.5	1.25	70	125	30
Chloromethane (methyl chloride)	74-87-3	22000	10	5	2.5	50	130	30
cis-1,2-Dichloroethene (cis-1,2-DCE)	156-59-2	7000	5	2.5	1.25	65	125	30
cis-1,3-Dichloropropene	10061-01-5	530	5	2.5	1.25	70	125	30
Dibromochloromethane (Chlorodibromomethane)	124-48-1	3400	5	2.5	1.25	65	130	30
Dibromomethane	74-95-3	38000	5	2.5	1.25	75	130	30
Dichlorodifluoromethane (CFC-12)	75-71-8	2000000	10	5	2.5	35	135	30
Ethylbenzene	100-41-4	70000	5	2.5	1.25	75	125	30
Hexachlorobutadiene (HCBD)	87-68-3	2000	5	2.5	1.25	55	140	30
Isopropylbenzene (Cumene)	98-82-8	1000000	5	2.5	1.25	75	130	30
m,p-Xylene	108-38-3/ 106-42-3	1000000	10	5	2.5	80	125	30
Methylene Chloride, or Dichloromethane	75-09-2	500	10	5	2.5	55	140	30
Naphthalene	91-20-3	200000	5	2.5	1.25	40	125	30
n-Butylbenzene	104-51-8	410000	5	2.5	1.25	65	140	30
n-Propylbenzene	103-65-1	410000	5	2.5	1.25	65	135	30
o-Xylene	95-47-6	1000000	5	2.5	1.25	75	125	30
p-Isopropyltoluene	99-87-6	1000000	5	2.5	1.25	75	130	30
sec-Butylbenzene	135-98-8	410000	5	2.5	1.25	65	130	30
Styrene	100-42-5	10000	5	2.5	1.25	75	125	30
tert-Butylbenzene	98-06-6	410000	5	2.5	1.25	65	130	30
Tetrachloroethene (PCE; PERC)	127-18-4	500	5	2.5	1.25	65	140	30
Toluene	108-88-3	100000	5	2.5	1.25	70	125	30
trans-1,2-Dichloroethene (trans-1,2-DCE)	156-60-5	10000	5	2.5	1.25	65	135	30
trans-1,3-Dichloropropene	10061-02-6	2900	5	2.5	1.25	65	125	30
Trichloroethene (TCE)	79-01-6	500	5	2.5	1.25	75	125	30

Analyte	CAS Number	TCEQ GWP-Ind MSC µg/kg	LOQ µg/kg	LOD µg/kg	DL µg/kg	LCL (%)	UCL (%)	RPD (%)
Trichlorofluoromethane (CFC-11)	75-69-4	3100000	10	5	2.5	25	185	30
Vinyl Chloride (VC)	75-01-4	200	5	2.5	1.25	60	125	30
1,2-Dichloroethane-d4 (Surrogate)	17060-07-0					75	140	
Bromofluorobenzene (Surrogate)	460-00-4					85	120	
Dibromofluoromethane (Surrogate)	1868-53-7					80	125	
Toluene-d8 (Surrogate)	2037-26-5					85	115	

Notes:

%	percent	LOQ	limit of quantitation	VOC	volatile organic compound
µg/kg	micrograms per kilogram	MS	matrix spike		
CAS	chemical abstracts number	MSC	medium-specific concentration		
DL	detection limit	MSD	matrix spike duplicate		
GWP-Ind	groundwater protection - industrial	NA	not applicable		
LCL	lower control limit	PCL	protective concentration level		
LCS	laboratory control sample	RPD	relative percent difference		
LOD	limit of detection	UCL	upper control limit		

Matrix: Aqueous
Analytical Group: Perchlorate
Method: 6850

Analyte	CAS Number	MCL µg/L	TCEQ GW-Ind MSC µg/L	Project Quantitation Limit Goal (µg/L)	LOQ µg/L	LOD µg/L	DL µg/L	LCL (%)	UCL (%)	RPD (%)
Perchlorate	14797-73-0	NA	72	72	1	0.5	0.2	80	120	15

Notes:

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Solid
Analytical Group: Perchlorate
Method: 6850

Analyte	CAS Number	TCEQ GWP-Ind MSC µg/kg	Project Quantitation Limit Goal (µg/kg)	LOQ µg/kg	LOD µg/kg	DL µg/kg	LCL (%)	UCL (%)	RPD (%)
Perchlorate	14797-73-0	7200	7200	20	10	5	80	120	15

Notes:

%	percent	MCL	maximum contaminant limit
µg/kg	micrograms per kilogram	MS	matrix spike
CAS	chemical abstracts number	MSC	medium-specific concentration
DL	detection limit	MSD	matrix spike duplicate
GWP-Ind	groundwater protection - industrial	NA	not applicable
LCL	lower control limit	RPD	relative percent difference
LCS	laboratory control sample	TCEQ	Texas Commission on Environmental Quality
LOD	limit of detection	UCL	upper control limit
LOQ	limit of quantitation	VOC	volatile organic compound

Matrix: Aqueous
Analytical Group: Explosives
Method: 8330

Analyte	CAS Number	MCL µg/L	TCEQ GW-Ind MSC µg/L	Project Quantitation Limit Goal (µg/L)	LOQ µg/L	LOD µg/L	DL µg/L	LCL (%)	UCL (%)	RPD (%)
2,4,6-Trinitrotoluene (TNT)	118-96-7		51	51	0.320	0.160	0.0800	50	145	20
2,4-Dinitrotoluene (DNT)	121-14-2		0.42	0.42	0.320	0.160	0.0800	60	135	20
2,6-Dinitrotoluene	606-20-2		0.42	0.42	0.320	0.160	0.0800	60	135	20
2-Amino-4,6-dinitrotoluene	35572-78-2		17	17	0.320	0.160	0.0800	50	155	20
4-Amino-2,6-dinitrotoluene	19406-51-0		17	17	0.320	0.160	0.0800	55	155	20

Notes:
Bold italicized numbers indicate value greater than the applicable regulatory standard.

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Solid
Analytical Group: Explosives
Method: 8330

Analyte	CAS Number	TCEQ GWP-Ind MSC mg/kg	Project Quantitation Limit Goal (mg/kg)	LOQ mg/kg	LOD mg/kg	DL mg/kg	LCL (%)	UCL (%)	RPD (%)
2,4,6-Trinitrotoluene (TNT)	118-96-7	5.1	5.1	0.080	0.040	0.020	55	140	20
2,4-Dinitrotoluene (DNT)	121-14-2	0.042	0.042	0.080	0.040	0.020	80	125	20
2,6-Dinitrotoluene	606-20-2	0.042	0.042	0.080	0.040	0.020	80	125	20
2-Amino-4,6-dinitrotoluene	35572-78-2	1.7	1.7	0.080	0.040	0.020	80	125	20
4-Amino-2,6-dinitrotoluene	19406-51-0	1.7	1.7	0.080	0.040	0.020	80	125	20

Notes:
Bold italicized numbers indicate value greater than the applicable regulatory standard.

%	percent	LCL	lower control limit	NA	not applicable
µg/kg	micrograms per kilogram	LCS	laboratory control sample	PCL	protective concentration levelRPD
CAS	chemical abstracts number	LOD	limit of detection	UCL	upper control limit
DL	detection limit	LOQ	limit of quantitationmg/kg	VOC	volatile organic compound
GWP-Ind	groundwater protection - industrial	MS	matrix spike		
		MSC	medium-specific concentration		
		MSD	matrix spike duplicate		

Matrix: Aqueous
Analytical Group: Total and Dissolved Metals
Method: 6010 Low

Analyte	CAS Number	MAL (mg/L)	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Aluminum	7429-90-5		*	*	0.05	0.025	0.0125	80	120	20
Antimony	7440-36-0		0.006	0.006	0.0025	0.002	0.00125	80	120	20
Arsenic	7440-38-2		0.01	0.01	0.0025	0.0015	0.00075	80	120	20
Barium	7440-39-3		2.0	2.0	0.01	0.0025	0.00125	80	120	20
Beryllium	7440-41-7		0.004	0.004	0.00125	0.0005	0.00025	80	120	20
Cadmium	7440-43-9		0.005	0.005	0.00125	0.0005	0.00025	80	120	20
Calcium	7440-70-2		*	*	1.25	0.5	0.25	80	120	20
Chromium, total	7440-47-3		0.1	0.1	0.0025	0.001	0.0005	80	120	20
Cobalt	7440-48-4		6.1	6.1	0.003125	0.0025	0.00125	80	120	20
Copper	7440-50-8		1.3	1.3	0.0025	0.002	0.001	80	120	20
Iron	7439-89-6		*	*	0.025	0.015	0.0075	80	120	20
Lead	7439-92-1		0.015	0.015	0.0125	0.0075	0.000375	80	120	20
Magnesium	7439-95-4		*	*	1.25	0.75	0.25	80	120	20
Manganese	7439-96-5		14	14	0.00375	0.0015	0.00075	80	120	20
Nickel	7440-02-0		2.0	2.0	0.0025	0.0015	0.00075	80	120	20
Potassium	7440-09-7		*	*	1.25	0.75	0.25	80	120	20
Selenium	7782-49-2	0.00005	0.005	0.005	0.0025	0.00125	0.00075	80	120	20
Silver	7440-22-4		0.51	0.51	0.0025	0.0005	0.00025	80	120	20
Sodium	7440-23-5		*	*	1.25	0.75	0.25	80	120	20
Thallium	7440-28-0		0.002	0.002	0.002	0.001	0.00075	80	120	20
Vanadium	7440-62-2		0.72	0.72	0.003125	0.0025	0.00125	80	120	20
Zinc	7440-66-6		31	31	0.005	0.0025	0.00125	80	120	20

Notes:
*These compounds: acetic acid, ammonium polyphosphate, ammonium salts, calcium, chloride, ethylene, hydrogen chloride (hydrochloric acid), iron, limonene, magnesium, phosphorus, total, potassium, sodium, sulfate, sulfide, and sulfured, are not necessarily of concern from a human health standpoint, therefore calculation of human health-based values is not required. However, aesthetics and ecological criteria would still apply. See table entitled "Compounds for which Calculation of a Human Health PCL is Not Required" available on the TCEQ website at http://www.tceq.texas.gov/assets/public/remediation/trrp/nohealth-trrp033007.pdf

%	percent	MAL	minimum analytical limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Solid
Analytical Group: Total and Dissolved Metals
Method: 6010 Low

Analyte	CAS Number	TCEQ GWP-Ind MSC mg/kg	Project Quantitation Limit Goal (mg/kg)	LOQ mg/kg	LOD mg/kg	DL mg/kg	LCL (%)	UCL (%)	RPD (%)
Aluminum	7429-90-5	10000	10000	10	5	2.5	80	120	20
Antimony	7440-36-0	0.6	0.6	0.50	0.4	0.25	80	120	20
Arsenic	7440-38-2	1	1	0.5	0.3	0.15	80	120	20
Barium	7440-39-3	200	200	2	0.5	0.25	80	120	20
Beryllium	7440-41-7	0.4	0.4	0.25	0.1	0.05	80	120	20
Cadmium	7440-43-9	0.5	0.5	0.25	0.1	0.05	80	120	20
Calcium	7440-70-2			250	100	50	80	120	20
Chromium, total	7440-47-3	10	10	0.5	0.2	0.1	80	120	20
Cobalt	7440-48-4	610	610	0.625	0.5	0.25	80	120	20
Copper	7440-50-8	130	130	0.5	0.4	0.2	80	120	20
Iron	7439-89-6			7.5	3	1.5	80	120	20
Lead	7439-92-1	1.5	1.5	0.25	0.15	0.075	80	120	20
Magnesium	7439-95-4			250	150	50	80	120	20
Manganese	7439-96-5	1400	1400	0.75	0.3	0.15	80	120	20
Nickel	7440-02-0	200	200	0.5	0.3	0.15	80	120	20
Potassium	7440-09-7			250	150	50	80	120	20
Selenium	7782-49-2	5	5	0.5	0.25	0.15	80	120	20
Silver	7440-22-4	51	51	0.5	0.1	0.05	80	120	20
Sodium	7440-23-5			250	150	50	80	120	20
Thallium	7440-28-0	0.2	0.2	0.4	0.2	0.15	80	120	20
Vanadium	7440-62-2	72	72	0.625	0.5	0.25	80	120	20
Zinc	7440-66-6	3100	3100	1	0.5	0.25	80	120	20

Notes:
Bold italicized numbers indicate value greater than the applicable regulatory standard.

%	percent	LOD	limit of detection	NA	not applicable
CAS	chemical abstracts number	LOQ	limit of quantitation	PCL	protective concentration level
DL	detection limit	mg/kg	milligrams per kilogram	RPD	relative percent difference
GW-Ind	groundwater - industrial	MS	matrix spike	TCEQ	Texas Commission on Environmental
LCL	lower control limit	MSC	medium-specific concentration	UCL	upper control limit
LCS	laboratory control sample	MSD	matrix spike duplicate		

Matrix: Aqueous
Analytical Group: Total and Dissolved Mercury
Method: 7470A

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Mercury	7439-97-6	0.002	0.002	0.002	0.0002	0.00016	0.00008	80	120	20

Notes:

%	percent	LOQ	limit of quantitation
µg/L	micrograms per liter	MCL	maximum contaminant limit
CAS	chemical abstracts number	mg/L	milligrams per liter
DL	detection limit	MS	matrix spike
GW-Ind	groundwater - industrial	MSC	medium-specific concentration
LCL	lower control limit	MSD	matrix spike duplicate
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Solid
Analytical Group: Total and Dissolved Mercury
Method: 7471A

Analyte	CAS Number	TCEQ GWP-Ind MSC mg/kg	Project Quantitation Limit Goal (mg/kg)	LOQ mg/kg	LOD mg/kg	DL mg/kg	LCL (%)	UCL (%)	RPD (%)
Mercury	7439-97-6	0.2	0.2	0.033	0.0266	0.0130	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
CAS	chemical abstracts number	mg/kg	milligrams per kilogram
DL	detection limit	MS	matrix spike
GW-Ind	groundwater - industrial	MSC	medium-specific concentration
LCL	lower control limit	MSD	matrix spike duplicate
LCS	laboratory control sample	PCL	protective concentration level
LOD	limit of detection	RPD	relative percent difference
LOQ	limit of quantitation	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: Ammonia
Method: /SM4500-NH3

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Ammonia as N	7664-41-7	NA	NA	NA	0.06	0.04	0.02	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Aqueous
Analytical Group: Total Phosphorus
Method: SM4500-P(B5)E

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Phosphorus, as P	7723-14-0	NA	NA	NA	0.080	0.040	0.0200	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Aqueous
Analytical Group: Orthophosphate
Method: /SM4500-PE

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Phosphate, Ortho (as P)	14265-44-2	NA	NA	NA	0.040	0.020	0.0100	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Aqueous
Analytical Group: Total Organic Carbon
Method: ESM5310C

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Total Organic Carbon	TOC	NA	NA	NA	3.0	2.50	1.25	85	115	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Solid
Analytical Group: Total Organic Carbon
Method: Lloyd Kahn

Analyte	CAS Number	TCEQ GWP-Ind MSC mg/kg	Project Quantitation Limit Goal (mg/kg)	LOQ mg/kg	LOD mg/kg	DL mg/kg	LCL (%)	UCL (%)	RPD (%)
Total Organic Carbon	TOC	NA	NA	800	400	200	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/kg	micrograms per kilogram	mg/kg	milligrams per kilogram
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GWP-Ind	groundwater protection - industrial	MSD	matrix spike duplicate
		NA	not applicable
LCL	lower control limit	PCL	protective concentration level
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Aqueous
Analytical Group: Hexavalent Chromium
Method: SW7196A

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Hexavalent Chromium	18540-29-9	NA	0.1	0.1	0.025	0.02	0.0100	90	110	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Solid
Analytical Group: Hexavalent Chromium
Method: SW7196A

Analyte	CAS Number	TCEQ GWP-Ind MSC mg/kg	Project Quantitation Limit Goal (mg/kg)	LOQ mg/kg	LOD mg/kg	DL mg/kg	LCL (%)	UCL (%)	RPD (%)
Hexavalent Chromium	18540-29-9	10	10	1.0	0.8	0.4	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/L	micrograms per liter	mg/L	milligrams per liter
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Aqueous
Analytical Group: Common Anions
Method: 9056A

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Bromide	24959-67-9				0.25	0.125	0.05	80	120	20
Chloride	16887-00-6				0.500	0.33	0.170	80	120	20
Fluoride	16984-48-8				0.25	0.10	0.0330	80	120	20
Nitrate as N	14797-55-8		10	10	0.25	0.10	0.0330	80	120	20
Nitrite as N	14797-65-0		1	1	0.25	0.10	0.0330	80	120	20
Sulfate as SO4	14808-79-8				2.5	1.0	0.330	80	120	20

Notes:
*These compounds, acetic acid, ammonium polyphosphate, ammonium salts, calcium, chloride, ethylene, hydrogen chloride (hydrochloric acid), iron, limonene, d-, magnesium, phosphorus, total, potassium, sodium, sulfate, sulfide, and sulfured, are not necessarily of concern from a human health standpoint, therefore calculation of human health-based values is not required. However, aesthetics and ecological criteria would still apply. See table entitled "Compounds for which Calculation of a Human Health PCL is Not Required" available on the TCEQ website at:
http://www.tceq.texas.gov/assets/public/remediation/trrp/nohealth-trrp033007.pdf

%	percent	MCL	maximum contaminant limit
CAS	chemical abstracts number	mg/L	milligrams per liter
DL	detection limit	MS	matrix spike
GW-Ind	groundwater – industrial	MSC	medium-specific concentration
LCL	lower control limit	MSD	matrix spike duplicate
LCS	laboratory control sample	NA	not applicable
LOD	limit of detection	RPD	relative percent difference
LOQ	limit of quantitation	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Solid
Analytical Group: Common Anions
Method: 9056A

Analyte	CAS Number	TCEQ GWP-Ind MSC mg/kg	Project Quantitation Limit Goal (mg/kg)	LOQ mg/kg	LOD mg/kg	DL mg/kg	LCL (%)	UCL (%)	RPD (%)
Bromide	24959-67-9			2.5	1.25	0.5	80	120	20
Chloride	16887-00-6			5.0	3.3	1.7	80	120	20
Fluoride	16984-48-8			2.50	1	0.33	80	120	20
Nitrate as N	14797-55-8	1000	1000	2.50	1	0.33	80	120	20
Nitrite as N	14797-65-0	100	100	2.50	1	0.33	80	120	20
Sulfate as SO4	14808-79-8			25.0	10	3.3	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
µg/kg	micrograms per kilogram	mg/kg	milligrams per kilogram
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GWP-Ind	groundwater protection - industrial	MSD	matrix spike duplicate
		NA	not applicable
LCL	lower control limit	PCL	protective concentration level
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

Matrix: Air
Analytical Group: Volatiles
Method: TO-15

Analyte	CAS Number	TCEQ Short-Term Health AMCV (µg/m^3)	TCEQ Short-Term ESL (µg/m3)	LOQ (µg/m3)	LOD (µg/m3)	DL (µg/m3)
1,1-Dichloroethane	75-34-3	4047	4000	0.50	0.42	0.16
1,1-Dichloroethene	75-35-4	714	210	0.50	0.42	0.17
1,2-Dichloroethane	107-06-2	162	160	0.50	0.42	0.16
1,3-Dichlorobenzene	541-73-1	NE	720	0.50	0.44	0.15
Acetone	67-64-1	NE	5900	5.0	2.1	0.77
alpha-Pinene	80-56-8	3499	60	0.50	0.42	0.14
Benzene	71-43-2	575	170	0.50	0.44	0.16
Carbon Disulfide	75-15-0	NE	30	5.0	0.39	0.15
Chloroform	67-66-3	98	100	0.50	0.42	0.17
cis-1,2-Dichloroethene	156-59-2	NE	7900	0.50	0.43	0.16
Dichlorodifluoromethane (CFC 12)	75-71-8	49452	50000	0.50	0.40	0.17
d-Limonene	5989-27-5	NE	1100	0.50	0.42	0.14
Ethanol	64-17-5	NE	18800	5.0	2.0	0.80
Ethylbenzene	100-41-4	86844	740	0.50	0.43	0.16
m,p-Xylenes	179601-23-1	7382	180	1.0	0.84	0.30
Methylene Chloride	75-09-2	12158	3600	0.50	0.40	0.17
n-Hexane	110-54-3	6336	5300	0.50	0.41	0.15
o-Xylene	95-47-6	7382	1600	0.50	0.41	0.15
Propene	115-07-1	Asphyxiant	Asphyxiant	0.50	0.39	0.14
Styrene	100-42-5	21725	110	0.50	0.44	0.15
Tetrachloroethene	127-18-4	6782	2000	0.50	0.39	0.14
Toluene	108-88-3	15074	640	0.50	0.42	0.17
trans-1,2-Dichloroethene	156-60-5	NE	7900	0.50	0.42	0.19
Trichloroethene	79-01-6	537	540	0.50	0.42	0.14
Trichlorofluoromethane	75-69-4	56184	28000	0.50	0.40	0.17
Trichlorotrifluoroethane	76-13-1	NE	38000	0.50	0.43	0.17
Vinyl Chloride	75-01-4	66460	20000	0.50	0.39	0.17

Notes:
Air analytical results are compared to the AMCV. If an AMCV has not been established for a particular parameter, the ESL is used for comparison.

µg/m^3	micrograms per cubic meter	DL	detection limit	LOQ	limit of quantitation
AMCV	Air Monitoring Comparison Values	ESL	Effects Screening Levels	NE	not established
CAS	chemical abstracts number	LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality

Matrix: Aqueous
Analytical Group: Alkalinity
Method: EPA SM2320B

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Alkalinity, Total (as CACO3)	471-34-1	NA	NA	NA	1.00	1.00	1.00	80	120	20
Carbon dioxide	124-38-9	NA	NA	NA	1.00	1.00	1.00	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
CAS	chemical abstracts number	mg/L	milligrams per liter
DL	detection limit	MS	matrix spike
GW-Ind	groundwater - industrial	MSC	medium-specific concentration
LCL	lower control limit	MSD	matrix spike duplicate
LCS	laboratory control sample	NA	not applicable
LOD	limit of detection	RPD	relative percent difference
LOQ	limit of quantitation	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: Dissolved Gases
Method: RSK175

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Ethane	74-84-0	NA	NA	NA	4.00	2.00	1.00	80	120	20
Ethene	74-85-1	NA	NA	NA	4.00	2.00	1.00	80	120	20
Methane	74-82-8	NA	NA	NA	4.00	2.00	1.00	80	120	20

Notes:

%	percent	MCL	maximum contaminant limit
CAS	chemical abstracts number	mg/L	milligrams per liter
DL	detection limit	MS	matrix spike
GW-Ind	groundwater - industrial	MSC	medium-specific concentration
LCL	lower control limit	MSD	matrix spike duplicate
LCS	laboratory control sample	NA	not applicable
LOD	limit of detection	RPD	relative percent difference
LOQ	limit of quantitation	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: Oil and Grease
Method: EPA 1664

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Oil and Grease	OILGREASE	NA	NA	NA	5.0	2.0	1.4	78	114	18

Notes:

%	percent	LOQ	limit of quantitation
µg/L	micrograms per liter	MCL	maximum contaminant limit
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: Chemical Oxygen Demand
Method: EPA 410.4

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Chemical Oxygen Demand	COD	NA	NA	NA	60	40	20	80	120	20

Notes:
* High Level Chemical Oxygen Demand (Concentration equal to or greater than 150mg/L)
**Low Level Chemical Oxygen Demand (Concentration lower than 150mg/L)

%	percent	MCL	maximum contaminant limit
CAS	chemical abstracts number	mg/L	milligrams per liter
DL	detection limit	MS	matrix spike
GW-Ind	groundwater – industrial	MSC	medium-specific concentration
LCL	lower control limit	MSD	matrix spike duplicate
LCS	laboratory control sample	NA	not applicable
LOD	limit of detection	RPD	relative percent difference
LOQ	limit of quantitation	TCEQ	Texas Commission on Environmantal Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: Iron, Ferrous
Method: SM3500Fe-B

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Ferrous Iron (Outside Certification)	Fe2	NA	NA	NA	1.00	1.00	1.00	80	120	20

Notes:

%	percent	LOQ	limit of quantitation
µg/L	micrograms per liter	MCL	maximum contaminant limit
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: Sulfide
Method: SM4500-S

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Sulfide	12597-04-5	NA	NA	NA	4.0	2.0	0.800	80	120	20

Notes:

%	percent	LOQ	limit of quantitation
µg/L	micrograms per liter	MCL	maximum contaminant limit
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: 1,4-Dioxane
Method: SW8270D Low

Analyte	CAS Number	MCL µg/L	TCEQ GW-Ind MSC (µg/L)	Project Quantitation Limit Goal (µg/L)	LOQ µg/L	LOD µg/L	DL µg/L	LCL (%)	UCL (%)	RPD (%)
1,4-Dioxane	123-91-1	NA	26	26	1.00	0.500	0.250	0.00025	5	110
2-Fluorobiphenyl (Surrogate)	321-60-8							50	110	
Terphenyl-d14 (Surrogate)	1718-51-0							50	135	
1,4-dioxane-d8										

Notes:

%	percent	LOQ	limit of quantitation
µg/L	micrograms per liter	MCL	maximum contaminant limit
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Solid
Analytical Group: 1,4-Dioxane
Method: SW8270D Low

Analyte	CAS Number	TCEQ GWP-Ind MSC µg/kg	Project Quantitation Limit Goal (µg/kg)	LOQ µg/kg	LOD µg/kg	DL µg/kg	LCL (%)	UCL (%)	RPD (%)
1,4-Dioxane	123-91-1	2600	2600	66.7	33.3	16.7	10	110	30
2-Fluorobiphenyl (Surrogate)	321-60-8						45	105	
Terphenyl-d14 (Surrogate)	1718-51-0						30	125	
1,-4-dioxane-d8									

Notes:

%	percent	LOQ	limit of quantitation
µg/L	micrograms per liter	MCL	maximum contaminant limit
CAS	chemical abstracts number	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater - industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
		UCL	upper control limit

Matrix: Aqueous
Analytical Group: Dehalococcoides Ethogenes
Method: qPCR

Analyte	CAS Number	MCL mg/L	TCEQ GW-Ind MSC (mg/L)	Project Quantitation Limit Goal (mg/L)	LOQ mg/L	LOD mg/L	DL mg/L	LCL (%)	UCL (%)	RPD (%)
Dehalococcoides ethogenes	NA	N/A	N/A	NA	100 cells/sample	100 cells/sample	500 cells/sample	NA	NA	NA
Dehalobactor	NA	N/A	N/A	NA	100 cells/sample	100 cells/sample	5000 cells/sample	NA	NA	NA

Notes:

%	percent	MCL	maximum contaminant limit
CAS	chemical abstracts number	mg/L	milligrams per liter
ceq/mL	membrane cell equivalents per milliliter	MS	matrix spike
DL	detection limit	MSC	medium-specific concentration
GW-Ind	groundwater – industrial	MSD	matrix spike duplicate
LCL	lower control limit	NA	not applicable
LCS	laboratory control sample	RPD	relative percent difference
LOD	limit of detection	TCEQ	Texas Commission on Environmental Quality
LOQ	limit of quantitation	UCL	upper control limit

WORKSHEET #16: PROJECT SCHEDULE TIMELINE TABLE

See report: "Longhorn IMS 081512 wo gantt.pdf"

WORKSHEET #17: SAMPLING DESIGN AND RATIONALE

Describe and provide a rationale for choosing the sampling approach (e.g., grid system, biased statistical approach):

Site-specific sampling approaches and associated rationale will be developed in site-specific work plans, as the approach may vary from site to site. Perimeter groundwater monitoring and surface water monitoring will be conducted to provide ongoing assessment for detection of any movement of contaminants beyond the LHAAP footprint.

Describe the sampling design and rationale in terms of what matrices will be sampled, what analytical groups will be analyzed and at what concentration levels, the sampling locations (including QC, critical, and background samples), the number of samples to be taken, and the sampling frequency (including seasonal considerations):

Groundwater samples will be collected from each existing monitoring well, and monitoring wells installed during the duration of the project; along with soil samples from various sites to determine the concentrations of metals, explosives, VOCs, and/or perchlorate in site groundwater and soil. Air samples will be taken weekly at the GWTP, until otherwise determined unnecessary. The analyte groups, as well as the number and locations of monitoring wells to be sampled were determined by the USEPA. All samples will be sent offsite for analysis. Groundwater and soil samples will potentially include testing of a portion of the following analysis, varying from site to site: total and dissolved TAL metals, perchlorate, the standard list of high explosives, VOCs, SVOCs, MNA parameters, dioxin, chlorinated solvents, and hexavalent chromium by Empicial Laboratories in Nashville, TN. Air sampling will include testing of VOCs under TO-15 and be analyzed by ALS Environmental located in Simi Valley, California. Samples for dehalococcoides and functional gene analysis will be sent to Microbial Insights in Knoxville, Tennessee. Field duplicate samples, MS/MSDs, and rinsate blanks will also be collected as QC samples.

Sampling at Longhorn AAP includes multiple sites with differing sampling designs and rationales, and will be conducted over a period of several years. Please refer to the most current site-specific documents (e.g., work plans and addendums) for specifics of sampling design and rationale at each Longhorn AAP site. See Figure 1 for LHAAP site locations.

WORKSHEET #18: SAMPLING LOCATIONS AND METHODS/SOP REQUIREMENTS TABLE

The Longhorn AAP QAPP is utilized as a long-term "site-wide" document, encompassing multiple sites in various life cycle stages. Therefore, the intended function of Worksheet #18 as a site-specific sampling and analysis plan is not applicable. Further, inclusion of site-specific sampling locations and analytes would cause the QAPP to become invalid any time a change to a sampling location or parameter is made.

Please refer to the most current site-specific documents (e.g., work plans and addendums) for specific information on current sampling locations and analytes for each Longhorn AAP site.

WORKSHEET #19: ANALYTICAL SOP REQUIREMENTS TABLE

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference	Containers (number, size, and type)	Sample volume (units)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation / analysis)
Aqueous	VOCs	SW8260B/SOP202	3 X 40-ml glass volatile vials	5 milliliters (ml)	HCl to a pH<2;Cool 0°C-6°C; no headspace	14 days to analysis
Aqueous	VOCs (where highly reactive compounds are the primary risk driver)	SW8260B/SOP202	3 X 40-ml glass volatile vials	5 ml	Cool 0°C-6°C; no headspace	7 days to analysis
Aqueous	Low-Level SVOC	SW8270D/SOP201,300	2 X 1-liter glass amber bottles	1000 ml	Cool 0°C-6°C	7 days until extraction/ 40 days extraction to analysis
Aqueous	Explosives	SW8330B/SOP327	2 X 1-liter glass amber bottles	1000 ml	Cool 0°C-6°C	7 days until extraction/ 40 days extraction to analysis
Aqueous	METALS (Total and Dissolved)	SW6010C, SW7470A/ SOP100/100A/105/103	1 X500 ml HDPE	50 ml ICP/ 30 ml Hg	Cool 0°C-6°C; HNO3 to a pH<2	180 days ICP, 28 days mercury
Aqueous	Perchlorate	6850/SOP239	1 X 500 mL HDPE	100 mL	Filtration (0.2µm), Cool 0°C-6°C	28 days to analysis
Aqueous	Total Phosphorus	SM4500-P(B5)E/SOP165	1 X 250 mL HDPE	100 mL	Cool 0°C-6°C, HCL or H2SO4 to pH 2	28 days
Aqueous	Orthophosphate	SM4500-PE/SOP165	1 X 250 mL HDPE	100 mL	Filtration (0.45µm), Cool 0°C-6°C	48 hours to analysis
Aqueous	Total Organic Carbon	SM 5310C/SOP221	1 X 250 mL HDPE	5 ml	Cool 0°C-6°C, HCL or H2SO4 to pH 2	28 days
Aqueous	Oil and Grease	EPA 1664A/ SOP101	1 X 1000 mL Glass	1000 mL	H2SO4 to a pH<2; Cool to 0°C-6°C	28 days
Aqueous	COD	EPA 410.4/ SOP163	1 X 250 ml plastic	5 ml	H2SO4 to a pH<2; Cool to 0°C-6°C	28 days
Aqueous	Alkalinity and Carbon dioxide	SM2320B/SOP154	1 X 250 ml HDPE	50 ml	Cool 0°C-6°C	14 days

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference	Containers (number, size, and type)	Sample volume (units)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation / analysis)
Aqueous	Anions	SW9056A/SOP145	1 X 250 mL HDPE	100 mL	Cool 0°C-6°C	48 hours for nitrate, nitrite: 28 days for all others
Aqueous	Hexavalent Chromium	SW846 7196A/ SOP166	1 X 250 ml plastic	100 mL	Cool to 0°C-6°C	24 hours to analysis! Notify of all shipments. Ship for receipt Monday - Friday.
Aqueous	Ammonia	SM4500NH3BG/SOP176	1 X 500 mL HDPE	100 mL	Cool 0°C-6°C, HCL or H2SO4 to pH 2	28 days
Aqueous	Sulfide	SM4500S2F/SOP153	1 X 500 mL HDPE	250mL	Cool 0°C-6°C, Zinc Acetate/NaOH to pH > 12	14 days
Aqueous	Ferrous Iron (Outside Cert)	SM3500FeD/SOP143	1 X 500 mL HDPE	100 mL	Cool 0°C-6°C	Field test received out of hold - Analyze within 48 hours of receipt. Ship for Monday-Thursday receipt.
Aqueous	Methane, Ethane, Ethene	RSK-175/SOP236	2 X 40-ml glass volatile vials	5 ml	HCl to a pH<2;Cool 0°C-6°C; no headspace	14 days to analysis
Groundwater and Surface Water	DHC and Dehalobactor	Dehalococcoides ethogenes/qPCR/MI-SOP qPCR	1 x 1L poly bottle	cells/ml	Cool 0°C-6°C	24-48 hours
Air	Volatiles	VOA-TO-15	6 L Summa canister	NA	NA	30 days
Solid	VOC	SW8260B/ SOP202, 225	3 X 40-milliliter (ml) terracores	5 grams (g)	Sodium bisulfate/methanol 0°C-6°C or preferred water/methanol freeze -7°C	48 hrs from sampling to pres., 14 days to analysis
Solid	METALS	SW6010C, SW7471B/SOP100,105,104	1 X 4-ounce glass	1-2 g/ 0.3 g mercury	Cool 0°C-6°C	180 days ICP, 28 days mercury

Matrix	Analytical Group	Analytical and Preparation Method / SOP Reference	Containers (number, size, and type)	Sample volume (units)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time (preparation / analysis)
Solid	Perchlorate	6850/SOP239	1 X 4-ounce glass	2 g	Cool 0°C-6°C, Store with headspace	28 days to leaching/ 28 days leaching to analysis
Solid	Explosives	SW8330B/SOP327	1 X 4-ounce glass jar or 1 gallon sampling bag for MIS	10 g	Cool 0°C-6°C	14 days until extraction/ 40 days extraction to analysis
Solid	Low-Level SVOC	SW8270D/SOP201,343	1 X 4-ounce glass	15 g	Cool 0°C-6°C	14 days until extraction/ 40 days extraction to analysis
Solid	Total Organic Carbon	Lloyd Kahn/SOP221	1 X 4-ounce glass	2 g	Cool 0°C-6°C	14 days
Solid	Anions	SW9056A/SOP145, 145A	1 X 4-ounce glass	5 g	Cool 0°C-6°C	28 days to leaching, 48 hours to analysis for nitrate, nitrite: 28 days to analysis for all others

Notes:
[1] Holding time begins at time of collection

°C	degrees Celsius	NA	not applicable
COD	chemical oxygen demand	$Na_2S_2O_3$	sodium thiosulfate
DHc	dehalococcoide	NO_2	nitrogen dioxide
USEPA	U.S. Environmental Protection Agency	NO_3	nitrate
HCl	hydrogen chloride	OG-HEM	oil and grease- hexane extractable material
HNO_3	nitric acid	oz.	ounce
H_2O	water	poly	polyethylene
H_2SO_4	sulfuric acid	SOP	Standard Operating Procedure
HCl	hydrochloric acid	SVOC	semi-volatile organic compound
HNO_3	nitric acid	TCLP	Toxicity Characteristic Leaching Procedure
L	liter	TKN	total kjehldahl nitrogen
MEOH	methyl alcohol	TOC	total organic carbon
mL	milliliter	VOC	volatile organic compound

WORKSHEET #20: FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE

Matrix	Analytical Group	Conc. Level	No. of Samples	No. of Equipment Rinsate Blanks	No. of Triplicate Blank Samples	No. of Field Duplicates	No. of MS/MSDs	Total No. of Samples to Lab
Groundwater/Solid	VOCs	Low	100	4	28	10	5/5	152
Groundwater/Solid	SVOCs	Low	100	4	28	10	5/5	152
Groundwater/Solid	Explosives	Low	100	4	NA	10	5/5	124
Groundwater/Solid	Metals	Low	100	4	NA	10	5/5	124
Groundwater/Solid	Perchlorate	Low	100	4	NA	10	5/5	124
Groundwater/Solid	Ammonia	Low	100	4	NA	10	5/5	124
Groundwater/Solid	Total Phosphorous	Low	100	4	NA	10	5/5	124
Groundwater/Solid	TOC	Low	100	4	NA	10	5/5	124
Groundwater/Solid	Common Anions	Low	100	4	NA	10	5/5	124
Groundwater	Chromium Hexavalent	Low	100	4	NA	10	5/5	124
Groundwater	COD	Low	100	4	NA	10	5/5	124
Groundwater	OG-HEM	Low	100	4	NA	10	5/5	124
Groundwater	Ferrous Iron	Low	100	4	NA	10	5/5	124
Groundwater	DHc	Low	100	4	NA	10	5/5	124
Groundwater	Orthophosphate	Low	100	4	NA	10	5/5	124
Groundwater	TKN	Low	100	4	NA	10	5/5	124
Groundwater	Alkalinity	Low	100	4	NA	10	5/5	124
Groundwater	Dissolved Gases	Low	100	4	NA	10	5/5	124
Air	SVOCs	Low	100	4	NA	10	5/5	124

Note:
1. Equipment blanks only required for analysis in site sampling activities.
2. Number of samples is site specific. This table serves as a guideline, given a pool of 100 samples.

COD	chemical oxygen demand	No.	number
Conc.	concentration	OG-HEM	oil and grease- hexane extractable material
DHc	dehalococcoide	SVOC	semi-volatile organic compound
MS	matrix spike	TKN	total kjehldahl nitrogen
MSD	matrix spike duplicate	TOC	total organic carbon
NA	not applicable	VOC	volatile organic compound

WORKSHEET #21: PROJECT SAMPLING SOP REFERENCE TABLE

SOP Title*	Originating Organization	Modified for Project Work? Yes/No	Comments
Attachment 1- Collection and Field Screening of Soil Samples	AECOM	Yes	None
Attachment 2 - Groundwater Sampling			
Attachment 5 - Subsurface Soil Sampling by Split Spoon			
Attachment 6 - Surface Soil Sampling			
Attachment 7 - Surface Water Sampling			
Attachment 8 - Packaging and Shipment of Environmental Samples			
Attachment 9 - Decontamination of Field Equipment			
Attachment 21 - Air Sampling			

Notes:
*SOPs are found in Appendix C of the IWWP.
AECOM AECOM Technical Services, Inc.
SOP Standard Operating Procedure

WORKSHEET #22: FIELD EQUIPMENT CALIBRATION, MAINTENANCE, TESTING, AND INSPECTION TABLE

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
GPS	NA	Charge Battery	Daily Before Use	Visual Inspection, Ensure Battery is Charged	Daily Before Use	Manufacturer Specifics	Obtain New GPS	FTL	Per Manufacturer's Manual
Water Level Tape	NA	NA	Daily Before Use	Visual Inspection	Daily Before Use	Manufacturer Specifics	Obtain New Water Level Tape	FTL	Per Manufacturer's Manual
Water Quality Meter	Daily – Before Use and After Last Use	Charge Battery	Daily Before Use	Visual Inspection, Ensure Battery is Charged	Daily Before Use	Manufacturer Specifics	Recalibrate	FTL	Per Manufacturer's Manual
Bladder Pump	NA	NA	Daily Before Use	Visual Inspection	Daily Before Use	Manufacturer Specifics	Obtain New Bladder Pump	FTL	Per Manufacturer's Manual
CO_2 Tank	NA	NA	Daily Before Use	Visual Inspection, Ensure Valve is Closed, Ensure Tank is Full	Daily Before Use	Manufacturer Specifics	Obtain New CO_2 Tank	FTL	Per Manufacturer's Manual
Summa® Canister	NA	NA	Daily Before Use	Visual Inspection	Daily Before Use	Manufacturer Specifics	Obtain New Summa® Canister	FTL	Per Manufacturer's Manual

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Tedlar® Gas Sampling Bag	NA	NA	Daily Before Use	Visual Inspection	Daily Before Use	Manufacturer Specifics	Obtain New Tedlar® Gas Sampling Bag	FTL	Per Manufacturer's Manual
PID	Daily - Before Use and After Last Use	Charge Battery	Daily Before Use	Visual Inspection, Ensure Battery is Charged	Daily Before Use	Manufacturer Specifics	Recalibrate	FTL	Per Manufacturer's Manual
Hand Auger	NA	NA	Daily Before Use	Visual Inspection	Daily Before Use	Manufacturer Specifics	Obtain New Hand Auger	FTL	Per Manufacturer's Manual

Notes:
CO_2 carbon dioxide
FTL Field Team Leader
GPS Global Positioning System
NA not applicable
PID photoionization detector
SOP Standard Operating Procedure

WORKSHEET #23: ANALYTICAL SOP REFERENCE TABLE

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
QS10	Laboratory Sample Receiving, Log In and Storage 09/03/2013 R20	NA	Receiving	NA	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
QS11	Field Sampling & Bottle Kit Preparation 01/27/2014 R16	NA	Sampling/Kits	NA	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
QS14	Analytical Laboratory Waste Disposal 01/23/2013 R08 Reviewed 03/10/2014	03/10/2014	Waste	NA	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP100	METALS DIGESTION/PREPARATION References: Methods 3005A, 3010A, 3050B and EPA 200.7 12/19/2013 R25	NA	Preparation	Metals Soil/Water	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
SOP100A	Metals Filtration Standard Operational Procedure(SOP) 07/17/2012 R03 Reviewed 07/31/2013	07/31/2013	Preparation	Metals Waters	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP101	N-Hexane Extractable Material (HEM) and Silica Gel Treated N-Hexane Extractable Material (SGT-HEM) by Extraction and Gravimetry (Oil and Grease and Non Polar Material) 09/03/2013 R12	NA	Definitive	General Chemistry Water	Gravimetric	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP103	Mercury Analysis in Water by Manual Cold Vapor Technique Methods USEPA SW846 7470A and 245.1 09/03/2013 R22	NA	Definitive	Metals Water	ICP	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP104	Mercury Analysis in Soil/Sediment by Manual Cold Vapor Technique Methods SW846 7471A or 7471B 09/03/2013 R22	NA	Definitive	Metals Soil	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
SOP105	Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) Technique SW-846 6010B; SW-846 6010C, EPA 200.7, SM 2340 B-2011 for Hardness Calculation 07/01/2013 R20	NA	Definitive	Metals Soil/Water	ICP	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP143	Determination of Ferrous Iron by Standard Methods 3500-Fe B 4c Phenanthroline Method Using HACH AccuVac Ampuls from Method 8146 09/07/2010 R01	NA	Definitive	General Chemistry Water	Spectrophotometer	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP145	Determination of Inorganic Anions in water by ION Chromatograph using the Dionex dx-500 Ion Chromatograph with Hydroxide Eluent And Dionex AS18 Column, USEPA Method 300.0/SW846 Method 9056 08/06/2013 R10	NA	Definitive	General Chemistry Soil/Water	IC	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
SOP145A	Anion Leaching Procedure Standard Operational Procedure(SOP 09/07/2010 R02 In Review	In Review	Preparation	General Chemistry Soil	IC	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP153	Sulfide by Standard Methods SM 4500-S2- C+F-2011 (Titrimetric, Iodine) with Sample Pretreatment to Remove Interfering Substances or to Concentrate the Sulfide 07/01/2013 R06	NA	Definitive	General Chemistry Water	Titrimetric	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP154	Total Alkalinity, Carbonate, Bicarbonate by Method SM 2320 B-2011 04/10/2013 R09	NA	Definitive	General Chemistry Water	Titrimetric	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP163	Chemical Oxygen Demand (High Level) by EPA Method 410.4 (Colormetric, Manual) 07/15/2013 R10	NA	Definitive	General Chemistry Water	Spectrophotometer	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
SOP165	Phosphorous, Total and ORTHO SM 4500-P B5 E-2011 and SM 4500-P E-2011 (Colorimetric, Ascorbic Acid, Single Reagent) 10/11/2013 R10	NA	Preparation	General Chemistry Water	Spectrophotometer	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP166	Hexavalent Chromium (Cr+6) Manual Method by SW846-7196A 08/06/2013 R11	NA	Definitive	General Chemistry Water	Spectrophotometer	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP176	Ammonia by Phenate Method EPA Method 350.1, SM4500NH3 G-2011 and Lachat Method 10-107-06-1-A (0.1 to 20 mg N/L as NH3) 10/11/2013 R13	NA	Definitive	General Chemistry Water	Lachat	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP201	GC/MS Semivolatiles, Regular and Low-Level, by EPA Method 625 and SW846 Method 8270C/8270D 09/09/2013 R23	NA	Definitive	GC/MS Water/Soil	GC/MS	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
SOP202	GC/MS Volatiles by EPA Method 624 & SW846 Method 8260B Including Appendix IX Compounds 03/17/2014 R27	NA	Definitive	GC/MS Water/Soil	GC/MS	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP221	Total Organic Carbon (TOC) by SM 5310 C-2011, SW846 Method 9060/9060A and Lloyd Kahn Method "Determination of TOC in Sediment" 10/11/2013 R15	NA	Definitive	General Chemistry Soil/Water	TOC	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP225	GC/MS Volatile Non-Aqueous Matrix Extraction Using SW-846 Method 5035/5035A for 8260B Analysis 03/06/2012 R10 In Review	In Review	Preparation	Organic Soil	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP236	Methane, Ethane, Ethene in Aqueous Samples by Modified RSK-175 (Automated Headspace) 07/11/2013 R05	NA	Definitive	GC/FID Water	GC/FID	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
SOP239	Perchlorate in Water, Soil, and Solid Waste Using High Performance Liquid Chromatography/ Electrospray Ionization/ Mass Spectrometry by SW846 Method 6850 08/01/2013 R10	NA	Definitive	LC/MS Water/Soil	LC/MS	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP300	GC/MS Semi-Volatile BNA-Aqueous Matrix Extraction Using SW-846 Method 3510C for 8270C/625 Analysis 03/20/2012 R20 Reviewed 04/14/2014	04/14/2014	Preparation	Organic Water	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP327	Nitroaromatics and Nitramines by High Performance Liquid Chromatography (HPLC) Method 8330, 8330A, 8330B and 8332 02/07/2014 R25	NA	Definitive	HPLC Soil/Water	HPLC	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N
SOP343	BNA & Pesticide/PCBs & TPH Non-Aqueous Matrix (Microwave Extraction) Using SW-846 Method 3546 07/26/2013 R05	NA	Preparation	Organic Soil	NA	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228	N	N

Lab SOP Number	Title, Revision Date, and/or Number	Date Last Revisited if not Revised	Definitive or Screening Data	Matrix and Analytical Group	Instrument	Organization Performing Analysis	Variance to QSM (Y/N)	Modified for Project Work (Y/N)
VOA TO15	Determination of VOCs in Air Samples Collected in Specially Prepared Canisters and Gas Collection Bags and Analyzed by GC/MS; Revision 21, 2/15/2014	NA	Definitive	Air	GC/MS	ALS Environmental 2655 Park Center Drive, Ste. A Simi Valley, CA 93065	N	N
MI-SOP qPCR	QPCR- Quantitative Polymerase Chain Reaction	NA	Definitive	Aqueous	ABI 7300	Microbial Insights Inc. 10515 Research Drive Knoxville, TN 37932	N	N

Notes:

GC/FID	gas chromatograph/flame ionization detector
GC/MS	gas chromatograph/mass spectrometer
HPLC	high-performance liquid chromatography
IC	on chromatograph
ICP	inductively coupled plasma
ICAP-AES	inductively coupled argon plasma atomic emission spectroscopy
LCMS/MS	liquid chromatography-tandem mass spectrometry
NA	not applicable
PE ICP	Perkin Elmer inductively coupled plasma
SOP	Standard Operating Procedure
TOC	total organic carbon
UV-IV	ultraviolet-visible spectrophotometer
VOC	volatile organic compound

WORKSHEET #24: ANALYTICAL INSTRUMENT CALIBRATION TABLE

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
GC/MS (SW846 8260B)	Tuning	Prior to ICAL and at the beginning of each 12-hour period.	Refer to method for specific ion criteria.	Retune instrument and verify. Rerun affected samples. Flagging criteria are not appropriate.	Analyst/ Supervisor	SOP202
GC/MS (SW846 8260B)	Initial Calibration (ICAL) - for all analytes a minimum of five points must be used for linear regression, six points for second order regression	ICAL prior to sample analysis.	1) Average response factor for system performance check compounds (SPCCs): VOCs ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane; ≥ 0.1 for chloromethane, bromoform and 1,1-dichloroethane. 2) RSD for RFs for calibration check compounds (CCCs): VOCs ≤ 30% and one option below: -Option 1: RSD for each analyte ≤ 15%. -Option 2: linear least squares regression r ≥ 0.995. -Option 3: non-linear regression coefficient of determination (COD) r2 ≥ 0.99.	Correct problem then repeat ICAL. Flagging criteria are not appropriate.	Analyst/ Supervisor	
GC/MS (SW846 8260B)	Second Source Calibration Verification (ICV)	Once after each ICAL.	All project analytes within ± 20% of true value.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
GC/MS (SW846 8260B)	Retention time window position establishment	Once after each ICAL for each analyte and surrogate.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	N/A	Analyst/ Supervisor	
GC/MS (SW846 8260B)	Evaluation of relative retention times (RRT)	With each sample.	RRT of each target analyte within ± 0.06 RRT units.	Correct problem, then rerun ICAL. Flagging criteria are not appropriate.	Analyst/ Supervisor	
GC/MS (SW846 8260B)	Continuing Calibration Verification (CCV)	Daily prior to sample analysis for 12-hour analysis period	1) Average RF for SPCCs: VOCs ≥ 0.30 for chlorobenzene and 1,1,2,2-tetrachloroethane; ≥ 0.1 for chloromethane, bromoform and 1,1-dichloroethane. 2) %Difference/Drift for all target compounds and surrogates: VOCs ≤ 20%D (Note, D = Difference when using RFs, D = Drift when using least squares regression or non-linear calibration.)	If %D > +20% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -20%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
HPLC (SW8330B)	Initial Calibration	Upon instrument receipt, for major instrument changes, or when CCV does not meet criteria	Min 5 pt initial Calibration for all target analytes (6 pts for non-linear) % relative standard deviation (%RSD) <15%; or Linear regression R-Squared >0.990 (R>0.995); or Non-linear regression R-Squared ≥ 0.990 (6 pts for non-linear).	Repeat Calibration if criteria are not met	Analyst/Supervisor	SOP327
HPLC (SW8330B)	Initial Calibration Verification	After Calibration	%D ≤ 20% all analytes	Evaluate, repeat, if still failing, recalibrate.	Analyst/Supervisor	
HPLC (SW8330B)	Continuing Calibration	Daily, after every 10 field samples and at end of run	%D ≤ 20%	If %D > +20% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -20%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/Supervisor	
HPLC/MS Perchlorate (6850)	Tuning	Prior to ICAL	Must contain the analytes of interest and meet SOP criteria.	Re-tune and/or clean source	Analyst/Supervisor	SOP239

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
HPLC/MS Perchlorate (6850)	Initial Calibration	Upon instrument receipt, for major instrument changes, or when continuing calibration verification (CCV) does not meet criteria	Min 5 pt initial Calibration for all analytes (6 pts for non-linear) % relative standard deviation (%RSD) <20%; or Linear regression R-Squared >0.990 (R>0.995); or Non-linear regression R-Squared ≥ 0.990 (6 pts for non-linear). Concentration at Y-intercept must be <LOD	Repeat Calibration if criteria is not met	Analyst/Supervisor	
HPLC/MS Perchlorate (6850)	Initial Calibration Verification	After Calibration	%D ≤ 15%	Evaluate, repeat, if still failing, recalibrate.	Analyst/Supervisor	
HPLC/MS Perchlorate (6850)	Limit of detection verification (LODV)	Prior to samples and at the end of the analysis sequence. Can be analyzed after every 10 field samples.	%D ≤ 30%	If %D is high and sample result is <LOQ, qualify/narrate with project approval. If %D is low or project approval not received, reanalyze all samples since last successful LODV.	Analyst/Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
HPLC/MS Perchlorate (6850)	Continuing Calibration	Prior to samples then after every 10 field samples.	%D $\leq$ 15%	If %D > +15% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -15%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/Supervisor	
ICP-AES (SW846 6010C)	Linear dynamic range or high-level check standard	Every 6 months	Within ±10% of true value.	N/A	Analyst/ Supervisor	SOP105
ICP-AES (SW846 6010C)	Initial Calibration (ICAL) - minimum one high standard and a calibration blank for all analytes	Daily ICAL prior to sample analysis.	If more than one calibration standard is used, correlation coefficient (r) $\geq$ 0.995 (r2>0.990)	Correct problem, then repeat ICAL. Flagging criteria are not appropriate.	Analyst/ Supervisor	
ICP-AES (SW846 6010C)	Second Source Calibration Verification (ICV)	Once after each ICAL, prior to beginning a sample run.	Value of second source for all analytes(s) within ±10% of true value.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
ICP-AES (SW846 6010C)	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the analysis sequence.	Within ± 10% of true value.	If %D > +10% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
ICP-AES (SW846 6010C)	Low-level calibration check standard	Daily, after one-point ICAL.	Within ±20% of true value.	Correct problem, then reanalyze. Flagging criteria are not appropriate.	Analyst/ Supervisor	
ICP-AES (SW846 6010C)	Calibration Blank	Before beginning a sample run, after every 10 samples, and at end of the analysis sequence.	No analytes detected > LOD.	Correct problem. Re-prep and reanalyze calibration blank. All samples following the last acceptable calibration blank must be reanalyzed. Apply B-flag to all results for specific analyte(s) in all samples associated with the blank.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
ICP-AES (SW846 6010C)	Interference check solutions (ICS)	After beginning of the analytical run	ICS-A: Absolute value of concentration for all non-spiked analytes < LOD ICS-AB: Within 20% of true value	Terminate analysis; locate and correct problem; reanalyze ICS, reanalyze all samples. If corrective action fails, Q qualify all associated analyte results.	Analyst/ Supervisor	
Cold vapor atomic absorption spectroscopy (CVAA) (SW7470A, 7471B)	Initial Calibration	Beginning of each day or if QC exceeds criteria	Min 5 pt initial Calibration and a calibration blank Linear regression R-Squared >0.990 (R>0.995)	Recalibrate and/or perform instrument maintenance	Analyst/Supervisor	SOP103/104
Cold vapor atomic absorption spectroscopy (CVAA) (SW7470A, 7471B)	Second Source Calibration Verification (ICV)	Once after each ICAL, prior to beginning a sample run.	Value of second source for all analytes(s) within ±10% of true value.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate.	Analyst/Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
Cold vapor atomic absorption spectroscopy (CVAA) (SW7470A, 7471B)	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the analysis sequence.	Within ± 20% of true value.	If %D > +20% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -20%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/Supervisor	
Ammonia (SM4500NH3BG)	Initial Calibration	Beginning of each day or if QC exceeds criteria	Min 5 pt initial Calibration and a calibration blank Linear regression R-Squared $\geq$0.990 ($R \geq 0.995$)	Recalibrate and/or perform instrument maintenance	Analyst/ Supervisor	SOP176
Ammonia (SM4500NH3BG)	Initial Calibration Verification	After Calibration	%D $\leq$ 10% all analytes	Evaluate, repeat, if still failing, recalibrate.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
Ammonia (SM4500NH3BG)	Continuing Calibration	Daily, after every 10 field samples and at end of run	%D ≤ 10% all analytes	If %D > +10% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
Total Phosphorus and Ortho-phosphate (SM4500PB5E and SM4500PE)	Initial Calibration	Every 6 months or as required when ICV exceeds limits.	Min 5 pt initial Calibration and a calibration blank Linear regression R-Squared ≥0.990 (R≥0.995)	Recalibrate and/or perform instrument maintenance	Analyst/ Supervisor	SOP165
Total Phosphorus and Ortho-phosphate (SM4500PB5E and SM4500PE)	Initial Calibration Verification	After Calibration	%D ≤ 10% all analytes	Evaluate, repeat, if still failing, recalibrate.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
Total Phosphorus and Ortho-phosphate (SM4500PB5E and SM4500PE)	Continuing Calibration	Daily, after every 10 field samples and at end of run	%D ≤ 10% all analytes	If %D > +10% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
TOC ANALYZER (SM5310C/LLOYD KAHN)	Initial Calibration	Prior to sample analysis or instrument change, when instrument does not meet method criteria	Linear regression R-Squared >0.990 (R>0.995)	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst/Supervisor	SOP221
TOC ANALYZER (SM5310C/LLOYD KAHN)	Second Source Calibration Verification (ICV)	Once after each ICAL, prior to beginning a sample run.	Value of second source for all analytes(s) within ± 10% of true value SM5310C, within ± 30% of true value Lloyd Kahn.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate.	Analyst/Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
TOC ANALYZER (SM5310C/LLOYD KAHN)	Continuing Calibration Verification (CCV)	After every 10 field samples and at the end of the analysis sequence.	Within ± 10% of true value SM5310C, within ± 30% of true value Lloyd Kahn	If %D > +10% (+30%) and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10% (-30%), correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/Supervisor	
Hexavalent Chromium (7196A)	Initial Calibration (ICAL)	_Every 6 months or as required when ICV exceeds limits. _Minimum 3 standards and a calibration blank _Low standard at the RL/LOD level	Linear fit with a correlation coefficient (r) of $\geq$0.995 ($r^2 \geq 0.990$)	Correct problem, then repeat ICAL. Flagging criteria are not appropriate.	Analyst/ Supervisor	SOP166
Hexavalent Chromium (7196A)	Second Source Calibration Verification (ICV)	Alternate source standard to be analyzed after every calibration curve and at the beginning of every analytical sequence	Value of second source for all analytes(s) within ±10% of true value.	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL. Flagging criteria are not appropriate.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
Hexavalent Chromium (7196A)	Continuing Calibration Verification (CCV)	After every 15-client samples and at the end of the analytical sequence	Within ± 10% of true value.	If %D > +10% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
Common Anions (SW9056A)	Initial Calibration	Beginning of each day or if QC exceeds criteria	Min 3 pt initial Calibration and a calibration blank Linear regression R-Squared $\geq$0.990 ($R \geq 0.995$)	Recalibrate and/or perform instrument maintenance	Analyst/ Supervisor	SOP145/145A
Common Anions (SW9056A)	Initial Calibration Verification	After Calibration	%D $\leq$ 10% all analytes	Evaluate, repeat, if still failing, recalibrate.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
Common Anions (SW9056A)	Continuing Calibration	Daily, after every 10 field samples and at end of run	%D $\leq$ 10% all analytes	If %D > +10% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
GC/MS TO-15	BFB Tuning Verification	Once every 24 hours of analytical batch	Ion abundance criteria as described in Table 3 of Method TO-15.	1) Repeat BFB analysis 2) Retune instrument	Analyst/Supervisor	VOA-TO15 _Rev.21
GC/MS TO-15	Initial Calibration (ICAL) -minimum of five levels	Initially or if continuing calibration no longer meets criteria	1) <30% RSD with 2 exceptions up to 40% 2) Area response at each calibration level within 40% of IS mean area response ove the ICAL range 3) Retention time for each IS within 20s of the mean retention time over the ICAL range	1) May repeat 1 point (if 5 levels) or 2 points (if 6 levels) 2) Inspect the system for problems and perform required maintenance 3) Repeat initial calibration Problem must be corrected. Samples may not be anlayzed until there is a valid ICAL.	Analyst/Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
GC/MS TO-15	CCV	Once every 24 hours, if an ICAL has not been performed (within the last 24 hours).	Percent difference of +/-30% Note: If CCV is biased high and analyte is ND, results are acceptable. It will be noted in the case narrative.	1) Reanalyze CCV 2) Identify and correct problem; re-analyze or if necessary qualify the data 3) Repeat initial calibration if CCV corrective action is unsucessful	Analyst/Supervisor	
GC/MS TO-15	ISs	All samples, duplicates, blanks and standards	1) RT must be <20 seconds from most recent valid calibration (ICAL midpoint or CCV) 2) Area response +/- 40% of IS area response of most recent valid calibration (ICAL midpoint or CCV)	1) Identify and correct the problem 2) Reanalyze the sample unless obvious matrix interference exists 3) Problem persists, qualify data	Analyst/Supervisor	
GC/MS TO-15	Surrogate Standards	All samples, duplicates, blanks and standards	70-130%	1) Identify and correct the problem 2) Reanalyze the sample unless obvious matrix interference exists 3) Problem persists, qualify data	Analyst/Supervisor	
GC/MS TO-15	Laboratory MB	Once every analytical batch of 20 or fewer samples	No analyte detected equal to or above the LOQ (DoD: No analytes > 1/2 LOQ; common lab contaminants none detected > LOQ)	1) Reanalyze blank 2) Identify and correct problem 3) Reanalzye blank and affected samples 4) Qualify data	Analyst/Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
GC/MS TO-15	Laboratory Control Sample	Once every analytical batch of 20 or fewer samples	Percent recovery (%R) within laboratory generated limits	1) Reanalyze 2) Identify and correct the problem 3) Qualify data *DoD projects require corrective acton for all exceedences	Analyst/Supervisor	
GC/MS TO-15	Laboratory Duplicate	Once every analytical batch of 20 or fewer samples	Relative percent difference within +/- 25% for positive hits	1) Analyze third aliquot 2) Flag data if third aliquot unacceptable	Analyst/Supervisor	
GC/MS TO-15	Holding Time	NA	SUMMA Canisters-30 days USEPA Region 9-14 days Tedlar bags-72 hours	Contact client and qualify data	Analyst/Supervisor	
GC/MS TO-15	LOQ	NA	At or above the low standard of the current initial calibration	NA	Analyst/Supervisor	
Alkalinity (SM2320B)	Calibration	Daily ICAL prior to sample analysis	4 ± 0.05 pH units, 7 ± 0.05 pH units, 10 ± 0.10 pH units	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst/Supervisor	SOP154
Alkalinity (SM2320B)	CCV	Every 3 hours after calibration	± 0.20 pH units for check	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst/Supervisor	SOP154

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
RSK175 SOP236	Initial Calibration	Upon instrument receipt, for major instrument changes, or when CCV does not meet criteria	Min 5 pt initial calibration standard; %RSD < 20%; or linear least squares regression r > 0.995 (r2>0.990) , or non-linear regression (minimum 6-point) coefficient of determination r2 > 0.990.	Repeat calibration if criteria is not met	Analyst/ Supervisor	SOP236
RSK175 SOP236	Initial Calibration Verification	After Calibration	%D < 20%	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Analyst/ Supervisor	
RSK175 SOP236	Continuing Calibration	Daily, and after every 10 field samples (not to exceed 12hrs), and at end of run	%D < 20%	If %D > +20% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -20%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
Oil and Grease EPA 1664A	Calibration/ICV/CCV	Not Applicable	Not Applicable	Not Applicable	Analyst/Supervisor	SOP101

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
COD (EPA 410.4)	Initial Calibration	Beginning of each day or if QC exceeds criteria	Min 5 pt initial Calibration and a calibration blank Linear regression R-Squared ≥0.990 (R≥0.995)	Recalibrate and/or perform instrument maintenance	Analyst/ Supervisor	SOP163
COD (EPA 410.4)	Initial Calibration Verification	After Calibration	%D ≤ 10% all analytes	Evaluate, repeat, if still failing, recalibrate.	Analyst/ Supervisor	
COD (EPA 410.4)	Continuing Calibration	Daily, after every 10 field samples and at end of run	%D ≤ 10% all analytes	If %D > +10% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
Ferrous Iron (SM3500FeD) Outside Certification	Initial Calibration	Beginning of each day or if QC exceeds criteria	Min 5 pt initial Calibration and a calibration blank Linear regression R-Squared ≥0.990 (R≥0.995)	Recalibrate and/or perform instrument maintenance	Analyst/ Supervisor	SOP143
Ferrous Iron (SM3500FeD) Outside Certification	Initial Calibration Verification	After Calibration	%D ≤ 10% all analytes	Evaluate, repeat, if still failing, recalibrate.	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
Ferrous Iron (SM3500FeD) Outside Certification	Continuing Calibration	Daily, after every 10 field samples and at end of run	%D ≤ 10% all analytes	If %D > +10% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -10%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
Sulfide Analysis (E376.1/SM4500S2F)	Calibration/ICV/CCV	Not Applicable	Not Applicable	Not Applicable	Analyst/ Supervisor	SOP153
GC/MS (SW846 8270D Low)	Tuning	Prior to ICAL and at the beginning of each 12 hour period	Must meet the ion abundance criteria required by the method.	Manual tuning; replacement of the ion source or filament. Rerun affected samples.	Analyst/ Supervisor	SOP201
GC/MS (SW846 8270D Low)	Breakdown Check (DDT only)	At the beginning of each 12-hour analytical sequence.	The degradation must be ≤20% for DDT to verify inertness of the injection port	**Excluded for Low-Level PAHs**	Analyst/ Supervisor	
GC/MS (SW846 8270D Low)	ICAL	Prior to sample analysis (minimum 5-point)	Average RF≥ 0.05; -Option 1: RSD for each analyte ≤ 15%. -Option 2: linear least squares regression r ≥ 0.995 (r2>0.990). -Option 3: non-linear regression coefficient of determination (COD) r2 ≥ 0.99.	Correct problem then repeat ICAL	Analyst/ Supervisor	

Instrument	Calibration Procedure	Frequency of Calibration	Acceptance Criteria	Corrective Action	Personnel Responsible for Corrective Action	Lab SOP Reference
GC/MS (SW846 8270D Low)	ICV	After each ICAL	All analytes within ± 20% of the expected value	Correct problem and verify second source standard. Rerun ICV. If that fails, correct problem and repeat ICAL.	Analyst/ Supervisor	
GC/MS (SW846 8270D Low)	CCV	Daily prior to sample analysis for 12-hour analysis period	RF ≥ 0.05; % difference/drift for target analytes ≤ 20%	If %D > +20% and sample result is < LOQ, request client approval to qualify and narrate. If %D < -20%, correct problem then rerun CCV. If that fails, repeat ICAL. Reanalyze all samples since last acceptable CCV. If reanalysis cannot be performed, Apply qualifier to all results for the specific analyte(s) in all samples since last acceptable CCV and explain in the case narrative.	Analyst/ Supervisor	
GC/MS (SW846 8270D Low)	Retention time window position establishment	Once after each ICAL for each analyte and surrogate.	Position shall be set using the midpoint standard of the ICAL curve when ICAL is performed. On days when ICAL is not performed, the initial CCV is used.	N/A	Analyst/ Supervisor	
ABI 7300-DHC	Initial	Primary	Standard curve R2 > 0.95	Rerun assay/check reagents	Laboratory manager	MI SOP ABI 7300
ABI 7300-DHC	Continuing calibration verification	Secondary-every plate (assay)	Calculated concentration within +/-20% of same concentration on standard curve	Rerun assay/check reagents	Laboratory manager	MI SOP ABI 7300

Note: Dehalococcoides associated instrument does not have associated quality control

amu	atomic mass unit	LOQ	limit of quantitation
BFB	4-bromofluoro-benzene	MB	method blank
CCB	continuing calibration blank	MS	mass spectrometer
CCC	calibration check compound	NA	not applicable
CCV	continuing calibration verification	ND	not detected
CoD	coefficient of determination	PAH	polycyclic aromatic hydrocarbon
DDT	dichlorodiphenyltrichloroethane	r	correlation coefficient
DHC	dehalococcoides	RF	response factor
DL	detection limit	RL	reporting limit
DoD	United States Department of Defense	RRF	relative response factor
Fe	iron	RRT	relative retention time
GC	gas chromatograph	RSD	relative standard deviation
HPLC	high performance liquid chromatography	SOP	Standard Operating Procedure
ICAL	initial calibration	SPCC	system performance check compound
ICB	internal calibration balance	SVOC	semi-volatile organic compound
ICS	interference check sample	TCLP	Toxicity Characteristic Leaching Procedure
ICSA	interference check sample A	TOC	total organic carbon
ICSAB	interference check sample B	UV-IV	ultraviolet-visible spectrophotometer
ICV	initial calibration verification	VOC	volatile organic compound
IS	internal standard		
LC	liquid chromatography		
LOD	limit of detection		

WORKSHEET #25: ANALYTICAL INSTRUMENT AND EQUIPMENT MAINTENANCE, TESTING, AND INSPECTION TABLE

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Gas Chromatograph/ Mass Spectrometer	Clean the source and replace the filaments. Replace the seal, liner and septum. Change the column.	Volatiles/ Semivolatiles	Check the gas supply. Check the seal, liner, and septum.	Source cleaning is performed when the instrument response deteriorates. Other instrument maintenance is done as needed to keep the instrument performing at peak performance.	The minimum RF for SPCCs must meet limits stated in method. All analytes must be $\leq$ 20 percent difference.	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards. Reanalyze the affected data.	Analyst/ Supervisor	SOP201/202
Gas Chromatograph/ Flame Ionization Detector	Check pressure and gas supply daily. Bake out column, change septa, liner, seal as needed, cut column as needed.	Methane, ethane, ethene	Liner, seal, septum, column	Prior to initial calibration or as necessary	Percent difference $\leq$ 20%	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards. Reanalyze the affected data	Analyst/ Supervisor	SOP219 SOP236
Inductively Coupled Plasma Spectrometer	Clean the torch assembly and the spray chamber when they become discolored or when degradation in data quality is observed. Clean the nebulizer, and check the argon supply. Replace the peristaltic pump tubing as needed	ICP Metals	Inspect the torch, nebulizer chamber, pump, and tubing	Maintenance is performed prior to initial calibration or as necessary.	Percent difference $\leq$ 10%	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards. Reanalyze the affected data.	Analyst/ Supervisor	SOP105

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Flow Injection Mercury System	Change the tubing, filter, clean windows, and check gas flow. Check the reagents and standards.	Mercury	Inspect the tubing, filter, and the optical cell	Maintenance is performed prior to initial calibration or as necessary.	Percent difference $\leq$ 20%	Recalibrate and/or perform the necessary equipment maintenance. Check the calibration standards. Reanalyze the affected data.	Analyst/ Supervisor	SOP103/104
Spectrophotometer	Clean reagent tubes. Change lamp.	Hexavalent Chromium Ortho-phosphate Total Phosphorus Ferrous Iron COD	Check wavelength	At the beginning of every run.	ICV/CCV 90-110% of true value	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst/ Supervisor	SOP166 SOP165 SOP143 SOP163
Ion Chromatograph	Replace column, seals	Anions	Check gas supply, check for leaks, check pistons	Daily or as needed	ICV/CCV 90-110% of true value	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data	Analyst/ Supervisor	SOP145
Total Organic Carbon Analyzer	Clean syringe, replace scrubber as needed, change filters as needed	TOC	Check gas supply, check lamp, tubing, reagent volumes	Prior to sample analysis, or when instrument does not meet method criteria	CCV $\leq$10% difference waters CCV $\leq$30% difference soils	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data	Analyst/ Supervisor	SOP221

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
High Performance Liquid Chromatography/ Mass Spectrometer	Check pressure and gas supply daily – change when <200psi, change analytical column as needed, change mobile phase when insufficient for run or contamination, change inlet filters as needed for contamination. Clean the source and replace the filaments.	Perchlorate	Check pump pressure, check for leaks, check for adequate mobile phase.	Source cleaning is performed when the instrument response deteriorates. Other instrument maintenance is done as needed to keep the instrument performing at peak performance.	CCV $\leq$ 15% difference.	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst/ Supervisor	SOP239
High Performance Liquid Chromatography/ Ultraviolet Detector	Check pressure and gas supply daily – change when <200psi, change analytical column as needed, change mobile phase when insufficient for run or contamination, change inlet filters as needed for contamination.	Dinitrotoluenes and Nitroglycerin	Check pump pressure, check for leaks, check for adequate mobile phase.	Prior to initial calibration or as necessary.	CCV $\leq$ 20% difference.	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data.	Analyst/ Supervisor	SOP327
pH Meter	Change buffer solutions or pH probe	Alkalinity	Change buffer solutions or pH probe	Before analysis begins, check every 3 hours	4 and 7 $\pm$ 0.05 pH units, pH 10 $\pm$ 0.10 pH units, $\pm$ 0.20 pH units for check	Recalibrate and/or perform necessary equipment maintenance. Check calibration standards. Reanalyze affected data	Analyst/ Supervisor	SOP154
Lachat	Flush/replace tubing	Ammonia	Tubing	As needed	ICV/CCV 90-110% of true value	Repeat maintenance activity of remove from service	Analyst/ Supervisor	SOP176

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
Analytical Balance	Annual service	Oil and Grease	Clean pan and make sure scales are balanced	Daily or as needed	Daily verification bracketing target weight ±0.1% or ±0.0005g, whichever is greater.	Repeat maintenance activity of remove from service	Analyst/ Supervisor	SOP101
Buret	Clean burette	Sulfide	Check burette tip for breakage	Before each use	Clean and unbroken	Replace broken burettes. Reanalyze	Analyst/ Supervisor	SOP153
GC/MS	Concentrating Trap	Air	NA	Routine maintenance includes periodic solvent cleaning	NA	NA	Analyst	VOA-TO-15 Rev. 21
GC/MS	Column performance	Air	NA	Monitored by observing both peak shapes and column bleed	NA	Change out column	Analyst	VOA-TO-15 Rev. 21
GC/MS	Vacuum system	Air	NA	Every six months, including changing the pump oil and checking the molecular sieve in the backstreaming trap	NA	NA	Analyst	VOA-TO-15 Rev. 21
ABI 7300	Dye calibration	DHC/Dehalobactor	Run dye plate	Annual	Specta follows normal pattern	contact manufacturer	Analyst	MI SOP ABI 7300
ABI 7300	Background	DHC/Dehalobactor	Run water plate	Monthly	No specta detected	Clean instrument and rerun	Analyst	MI SOP ABI 7300

Notes:

µm	micrometers	IC	ion chromatograph	PID	photoionization detector
CO_2	carbon dioxide	ICP	inductively coupled plasma	psi	pounds per square inch
COD	chemical oxygen demand	ISTD	internal standard	QC	quality control
CRDS	cavity ring down spectrometry	IRMS	isotope ratio mass spectrometry	RSD	relative standard deviation
DI	deionized	MEE	methane, ethane, ethene	SOP	standard operating procedure
EA	element analyzer	L	liter	TKN	total kjehldahl nitrogen
FE	iron	MS	mass spectrometer	TOC	total organic carbon
GC	gas chromatograph	NA	not applicable	UV	ultraviolet
HPLC	high-performance liquid chromatography	OG-HEM	oil and grease- hexane extractable material	VIS	visible

WORKSHEET #26: SAMPLE HANDLING SYSTEM

Sample Collection, Packaging, and Shipment

Sample Collection (Personnel/Organization): AECOM and/or qualified AECOM subcontractor, Field Team Leader (FTL)

Sample Packaging (Personnel/Organization): AECOM and/or qualified AECOM subcontractor, FTL

Coordination of Shipment (Personnel/Organization): AECOM and/or qualified AECOM subcontractor, FTL

Type of Shipment/Carrier: Overnight delivery service/United Parcel Service

Sample Receipt and Analysis

Sample Receipt (Personnel/Organization):

General Chemistry – Empirical Laboratories, Nashville, TN, Sample Receiving
Air Samples - ALS Environmental, Simi Valley, California, Sample Receiving
Biological Samples – Microbial Insights, Knoxville, Tennessee, Sample Receiving

Sample Custody and Storage (Personnel/Organization):
General Chemistry - Empirical Laboratories, Nashville, TN, Sample Receiving
Air Samples - ALS Environmental, Simi Valley, California, Sample Receiving
Biological Samples – Microbial Insights, Knoxville, Tennessee, Sample Receiving

Sample Preparation (Personnel/Organization):

General Chemistry - Empirical Laboratories, Nashville, TN, Ohio, Analysts
Air Samples - ALS Environmental, Simi Valley, California, Analysts
Biological Samples – Microbial Insights, Knoxville, Tennessee, Analysts

Sample Determinative Analysis (Personnel/Organization):

General Chemistry - Empirical Laboratories, Nashville, TN, Analysts
Air Samples - ALS Environmental, Simi Valley, California, Analysts
Biological Samples – Microbial Insights, Knoxville, Tennessee, Analysts

Sample Archiving

Field Sample Storage (No. of days from sample collection): Minimum of 30 days

Sample Extract/Digestate Storage (No. of days from extraction/digestion): Minimum of 30 days

Sample Disposal

Personnel/Organization:

General Chemistry - Empirical Laboratories, Nashville, TN
Air Samples - ALS Environmental, Simi Valley, California
Biological Samples – Microbial Insights, Knoxville, Tennessee

Number of Days from Analysis: Samples will be stored after analysis until disposed, in accordance with applicable local, state, and federal regulations. Disposal records will be maintained by the laboratory.

WORKSHEET #27: SAMPLE CUSTODY REQUIREMENTS

Field Sample Custody Procedures (sample collection, packaging, shipment, and delivery to laboratory): AECOM's sample collection procedures are described in Worksheets #14, #17 and #21. The field procedures for COC are provided in SOP COC Procedures No. 002, 02/19/10.

Laboratory Sample Custody Procedures (receipt of samples, archiving, and disposal): The sample receipt, archiving, and disposal procedures are discussed in Section 23, Handling of Samples, of the Empirical Laboratories, Nashville, TN, QA Manual.

Sample Identification Procedures: AECOM's procedures are discussed in Worksheets #14 and #21, the laboratory procedures are discussed in Worksheet #23.

COC Procedures: AECOM's COC procedures are discussed in SOP COC Procedures No. 002, 02/19/10, as listed in Worksheet #21. Laboratory COC procedures are discussed in Worksheet #23.

WORKSHEET #28: QC SAMPLE TABLES

Matrix: Groundwater / Soil/TCLP
Analytical Group: Volatiles
Analytical Method/SOP Reference: SW846 5030B / 5035A / 8260B / SOP202

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit. For common laboratory contaminants, no analytes detected >LOQ.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	See associated worksheet#15	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/Bias	Same as Acceptance Limits
Internal Standards (IS)	Each field and QC sample	Retention times for internal standards must be ± 30 seconds from retention time of the midpont standard in the ICAL and the responses within -50% to +100% of midpoint ICAL standard or daily CCV.	Re-analyze affected samples. If matrix affect demonstrated for a representative sample set, discuss with project chemist.	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits
Surrogates	Each field and QC sample	Surrogate / Soil 1,2-Dichloroethane-d4 / 75-140 Bromofluorobenzene / 85-120 Dibromofluoromethane / 80-125 Toluene-d8 / 85-115	If sample volume available and within 2x holding time, re-analyze affected samples. If matrix affect demonstrated for a representative sample set, discuss with project chemist.	Analyst/ Supervisor	Accuracy/Bias	Same as Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	See associated worksheet#15	Corrective action will not be taken for samples when recoveries are outside limits and surrogate and LCS criteria are met unless RPD indicate obvious extraction/analysis difficulties. Then, if sample volume available and <2x holding time, reprep and reanalyze MS/MSD.	Analyst/ Supervisor	Accuracy/Bias	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	MS/MSD	matrix spike/matrix spike duplicate
CCV	continuing calibration verification	NA	not applicable
DL	detection limit	QA	quality assurance
DQI	data quality indicator	QC	quality control
EICP	enclosed inductively coupled plasma	RL	reporting limit
GC/MS	gas chromatography/mass spectrometry	RPD	relative percent difference
ICAL	initial calibration	SOP	Standard Operating Procedure
LCS	laboratory control sample	TBD	to be determined
LOQ	limit of quantitation		

Matrix: Groundwater / Soil
Analytical Group: PAHs plus select SVOCs
Analytical Method/SOP Reference: SW846 8270D Low-Level / SOP201

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit. For common laboratory contaminants, no analytes detected >LOQ.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	See associated worksheet#15	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits
Internal Standards (IS)	Each field and QC sample	Retention times for internal standards must be ± 30 seconds from retention time of the midpont standard in the ICAL and the responses within -50% to +100% of midpoint ICAL standard or daily CCV.	Re-analyze affected samples. If matrix affect demonstrated for a representative sample set, discuss with project chemist.	Analyst/Supervisor	Accuracy	Same as Acceptance Limits
Surrogates	Each field and QC sample	**Analyte** / **Soil** / **Water** 2-Fluorobiphenyl / 45-105 / 50-110 Terphenyl-d14 / 30-125 / 50-135	If sample volume available and within 2x holding time, re-analyze affected samples. If matrix affect demonstrated for a representative sample set, discuss with project chemist.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	See associated worksheet#15	Corrective action will not be taken for samples when recoveries are outside limits and surrogate and LCS criteria are met unless RPD indicate obvious extraction/analysis difficulties. Then, if sample volume available and <2x holding time, reprep and reanalyze MS/MSD.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	LCS	laboratory control sample
DQI	data quality indicator	LOQ	limit of quantitation
EICP	enclosed inductively coupled plasma	MS/MSD	matrix spike/matrix spike duplicate
GC/MS	gas chromatography/mass spectrometry	QC	quality control
IS	internal standard	SOP	Standard Operating Procedure
ICAL	initial calibration	TBD	to be determined

Matrix: Groundwater / Soil

Analytical Group: Perchlorate

Analytical Method/SOP Reference: SW846 6850 / SOP239

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
35CL/37CL isotope ratio	Ever sample, batch QC sample and standard.	Ratio must fall within 2.3 – 3.8	Rerun samples with unacceptable ratio – cleanup, post-spike or dilute, as necessary to reduce interference.	Analyst, Laboratory Supervisor and Data Validator	Precision / Accuracy / Bias	Same as QC Acceptance Limits
Internal Standards	1 per sample	Relative retention times for internal standard must be 0.98-1.02 and the responses within ± 50% of the average response of the ICAL.	Reanalyze samples at increasing dilutions until the ± 50% criteria can be met	Analyst, Laboratory Supervisor and Data Validator	Precision / Accuracy / Bias	Same as QC Acceptance Limits
Method Blank	One per batch of 20 or less	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Reclean, retest, re-extract, reanalyze, and/or qualify data	Analyst, Laboratory Supervisor and Data Validator	Bias / Contamination	Same as QC Acceptance Limits
Laboratory Control Spike	One per batch of 20 or less	80-120% Recovery	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst, Laboratory Supervisor and Data Validator	Precision / Accuracy / Bias	Same as QC Acceptance Limits
Matrix spike / Matrix spike duplicate	One per SDG or every 20 samples.	80-120% Recovery, 15% RPD	Corrective action will not be taken for samples when recoveries are outside limits and LCS criteria are met unless RPD indicate obvious extraction/analysis difficulties. Then, if sample volume available and <2x holding time, reprep and reanalyze MS/MSD.	Analyst, Laboratory Supervisor and Data Validator	Precision / Accuracy / Bias	Same as QC Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Interference Check Sample (ICS)	Once ICS is prepared with every batch of 20 samples and must undergo the same preparation and pretreatment steps as the samples in the batch. It verifies the method performance at the matrix conductivity treshold (MCT). At least once ICS must be analyzed daily.	Within ±30% of the true value	Correct problem and then reanalyze all samples in that batch. If poor recovery from the cleanup filters is suspected, a different lot of filters must be used to reextract all samples in the batch. If column degradation is suspected, a new column must be calibrated before the samples can be reanalyzed.	Analyst, Laboratory Supervisor and Data Validator	Accuracy	Same as QC Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	O	oxygen
Cl	chlorine	QC	quality control
DQI	data quality indicator	QL	quantitation limit
IS	internal standard	RRT	relative retention time
LCS	laboratory control sample	SOP	Standard Operating Procedure
LODV	limit of detection verification	TBD	to be determined
MS/MSD	matrix spike/matrix spike duplicate		

Matrix: Groundwater / Soil
Analytical Group: Explosives
Analytical Method/SOP Reference: SW846 8330B / SOP327

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Soil grinding blank (milled samples)	Between each sample.	A grinding blank using clean solid matrix (such as Ottawa sand) must be prepared (e.g., ground and subsampled) and analyzed in the same manner as a field sample. Grinding blanks can be analyzed individually or composited. No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	All blank results must be reported and the affected samples must be flagged accordingly if blank criteria is not met. If the composite grinding blank exceeds the acceptance criteria, apply B-flag to all samples associated with the grinding composite. If any individual grinding blank is found to exceed the acceptance criteria, apply B-flag to the sample following that blank.	Analyst/Supervisor	Bias/ Contamination	Same as Acceptance Limits
Soil subsampling process	Each sample, duplicate, and batch LCS.	Entire ground sample is mixed, spread out on a large flat surface (e.g., baking tray), and 30 or more randomly located increments are removed from the entire depth to sum a ~10 g subsample.	NA	Analyst/Supervisor	Bias/ Contamination	Same as Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Soil sample triplicate	At the subsampling step, one sample per batch. Cannot be performed on any type of blank sample.	Three 10 g subsamples are taken from a sample expected to contain the highest levels of explosives within the Quantitation Range of the method. The RSD for results above the RL must not exceed 20%.	Corrective action must be taken if this criterion is not met (e.g., the grinding process should be investigated to ensure that the samples are being reduced to a sufficiently small particle size). Apply J-flag if corrective action does not solve problem and no sample available.	Analyst/Supervisor	Bias/ Contamination	Same as Acceptance Limits
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit. For common laboratory contaminants, no analytes detected >LOQ.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first. (For soils, a solid reference material containing all reported analytes must be prepared (e.g., ground and subsampled) and analyzed in exactly the same manner as a field sample.)	Recoveries for the LCS must demonstrate the laboratory's ability to meet the project's MQOs. See associated worksheet#15	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Surrogates	Each field and QC sample	1-Chloro-3-nitrobenzene Soil 55%-140% Water 40%-145%	If sample volume available and within 2x holding time, re-analyze affected samples. If matrix affect demonstrated for a representative sample set, discuss with project chemist.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	See associated worksheet#15	CA will not be taken for samples when recoveries are outside limits and surrogate and LCS criteria are met unless RPD indicate obvious extraction/analysis difficulties then reprep MS/MSD.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/Supervisor	Accuracy	Same as Acceptance Limits
Confirmation Column	When target analytes are detected on the primary column using the UV Detector (HPLC) at concentrations exceeding the Limit of Detection (LOD).	Calibration and QC criteria same as for initial or primary column analysis. Results between primary and second column RPD ±40%.	NA	Analyst/Supervisor	Accuracy	Apply qualifier if RPD > 40%.

Notes:

AECOM	AECOM Technical Services, Inc.	QC	quality control
DQI	data quality indicator	RPD	relative percent difference
LCS	laboratory control sample	SOP	Standard Operating Procedure
LOD	limit of detection	TBD	to be determined
LOQ	limit of quantitation		
MS/MSD	matrix spike/matrix spike duplicate		
NA	not applicable		

Matrix: Groundwater / Soil/TCLP

Analytical Group: Metals

Analytical Method/SOP Reference: SW846 6010C, 7470A, 7471B / SOP103, SOP104, SOP105

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix	Recovery within 80–120%	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix	Recovery within 80-120% (if sample is < 4x spike value) RPD≤20	Qualify results for affected analytes for all associated samples with "N." Perform PDS (ICP).	Analyst/ Supervisor	Accuracy /Bias	Same as Acceptance Limits
Lab duplicate	One per prep batch of 20 or fewer samples of similar matrix (unless MSD performed)	RPD≤20	Qualify associated data if original result >LOQ	Analyst/ Supervisor	Precision	Same as Acceptance Limits
Serial Dilution (ICP only)	One per prep batch of 20 or fewer samples of similar matrix	1:5 dilution must agree within ±10% of the original sample result if result is > 50x LOQ	Perform PDS (ICP).	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Post-digestion spike (PDS) addition (ICP only)	When dilution test fails or analyte concentration in all samples < 50 x LOD.	Recovery within 75-125%	For the specific analyte(s) in the parent sample, apply J-flag if acceptance criteria are not met.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.
DQI	data quality indicator
ICAL	initial calibration
ICP	inductively coupled plasma
IS	internal standard
LCS	laboratory control sample
LOD	limit of detection
LOQ	limit of quantitation
MS/MSD	matrix spike/matrix spike duplicate
NA	not applicable
QC	quality control
PDS	post dilution spike
RPD	relative percent difference
SOP	Standard Operating Procedure
TBD	to be determined

Matrix: Groundwater / Soil

Analytical Group: Total Phosphorus and Ortho-phosphate

Analytical Method/SOP Reference: SM4500PB5E or SM4500PE SOP165

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix	Must be 80 to 120% (LCSD < 20% RPD)	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/Bias	Same as Acceptance Limits
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix	Must be 75%-125% (MSD < 20% RPD)	If analyte level > 4x spiking level, % recovery cannot be evaluated and no corrective action. If not, sample data qualified.	Analyst/ Supervisor	Accuracy/Bias	Same as Acceptance Limits
Lab duplicate	Minimum of 10% of lab samples unless MSD performed	Must < 20% RPD	Associated data qualified, if original result >LOQ	Analyst/ Supervisor	Precision	Same as Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	MS	matrix spike
DQI	data quality indicator	QC	quality control
LCS	laboratory control sample	SOP	Standard Operating Procedure
LOQ	limit of quantitation	TBD	to be determined

Matrix: Aqueous

Analytical Group: Hexavalent Chromium

Analytical Method/SOP Reference: SW846 7196A / Empirical SOP166

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Blank	One per prep batch	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
Laboratory Control Sample (LCS)	One per prep batch	±10% water (with RPD <20)	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits
MS/MSD	One MS per water sample, if sample volume available. MSD every 10 water samples analyzed.	±15% water (with RPD <20)	Qualify results for affected analytes for all associated samples with "N." Perform PDS (ICP).	Analyst/ Supervisor	Accuracy, Precision	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	MS	matrix spike
DQI	data quality indicator	QC	quality control
LCS	laboratory control sample	SOP	Standard Operating Procedure
LOQ	limit of quantitation	TBD	to be determined

Matrix: Groundwater / Soil

Analytical Group: Ammonia

Analytical Method/SOP Reference: SM4500NH3 BG, SOP176

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/Supervisor	Bias/ Contamination	Same as Acceptance Limits
Batch spike/batch spike duplicate BS/(BSD)	One per prep batch (BSD if no volume for MSD)	Must be 80 to 120% (BSD < 20% RPD)	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS/MSD	One per prep batch (MSD or duplicate per prep batch)	Must be 75%-125% (MSD < 20% RPD)	If analyte level > 4x spiking level, % recovery cannot be evaluated and no corrective action. If not, sample data qualified.	Analyst/Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Lab duplicate	One per prep batch	Must < 20% RPD	Associated data qualified, if original result >LOQ	Analyst/Supervisor	Precision	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	MS	matrix spike
DQI	data quality indicator	QC	quality control
LCS	laboratory control sample	SOP	Standard Operating Procedure
LOQ	limit of quantitation	TBD	to be determined

Matrix: Groundwater / Soil

Analytical Group: TOC

Analytical Method/SOP Reference: SW846 9060 single or Lloyd Kahn/ SOP221

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 10 or fewer water samples of similar matrix; One per prep batch of 20 or fewer soil samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 10 or fewer water samples of similar matrix; One per prep batch of 20 or fewer soil samples of similar matrix; or one per day, whichever comes first	See associated worksheet#15	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix	See associated worksheet#15	Corrective action will not be taken for samples when recoveries are outside limits and LCS criteria are met unless RPD indicate obvious extraction/analysis difficulties. Then, if sample volume available and <2x holding time, reprep and reanalyze MS/MSD.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Lab duplicate	One per prep batch of 20 or fewer samples of similar matrix	See associated worksheet#15	If RPD > 20% and result is >LOQ, sample should be reanalyzed. If still high, result is flagged.	Analyst/ Supervisor	Precision	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	QC	quality control
DQI	data quality indicator	SOP	Standard Operating Procedure
LCS	laboratory control sample	TBD	to be determined
LOQ	limit of quantitation	TOC	total organic carbon
MS	matrix spike		

Matrix: Groundwater / Soil

Analytical Group: Oil and Grease (HEM)

Analytical Method/SOP Reference: EPA 1664A, SOP101

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
Batch spike/batch spike duplicate BS/(BSD)	One per prep batch (BSD if no volume for MSD)	Must be 78-114% (BSD $\leq$ 20% RPD)	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS(/MSD optional)	One per prep batch (MSD or duplicate per prep batch)	Must be 78-114% (MSD $\leq$ 20% RPD)	If analyte level > 4x spiking level, % recovery cannot be evaluated and no corrective action. If not, sample data qualified.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	OG-HEM	oil and grease- hexane extractable material
DQI	data quality indicator	QC	quality control
LCS	laboratory control sample	SOP	Standard Operating Procedure
LOQ	limit of quantitation	TBD	to be determined
MS	matrix spike		

Matrix: Groundwater / Soil

Analytical Group: Ferrous Iron (Outside Certification)

Analytical Method/SOP Reference: SM3500FeD, SOP143

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
Batch spike/batch spike duplicate BS/(BSD)	One per prep batch (BSD if no volume for duplicate)	Must be 80 to 120% (BSD < 20% RPD)	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS/MSD	One per prep batch (MSD or duplicate per prep batch)	Must be 75%-125% (MSD < 20% RPD)	If analyte level > 4x spiking level, % recovery cannot be evaluated and no corrective action. If not, sample data qualified.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Lab duplicate	One per prep batch	Must < 20% RPD	Associated data qualified, if original result >LOQ	Analyst/ Supervisor	Precision	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	MS	matrix spike
DQI	data quality indicator	QC	quality control
LCS	laboratory control sample	SOP	Standard Operating Procedure
LOQ	limit of quantitation	TBD	to be determined

Matrix: Groundwater / Soil

Analytical Group: COD

Analytical Method/SOP Reference: EPA 410.4, SOP163

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
Batch spike/batch spike duplicate BS/(BSD)	One per prep batch (BSD if no volume for duplicate)	Must be 90-110% (BSD < 20% RPD)	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS/MSD	One per prep batch (MSD or duplicate per prep batch)	Must be 90-110% (BSD < 20% RPD)	If analyte level > 4x spiking level, % recovery cannot be evaluated and no corrective action. If not, sample data qualified.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Lab duplicate	One per prep batch	Must < 20% RPD	Associated data qualified, if original result >LOQ	Analyst/ Supervisor	Precision	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	LCS	laboratory control sample	QC	quality control
COD	chemical oxygen demand	LOQ	limit of quantitation	SOP	Standard Operating Procedure
DQI	data quality indicator	MS	matrix spike NCR Nonconformance Report	TBD	to be determined

Matrix: Air
Analytical Group: Volatile Organics
Analytical Method/SOP Reference: VOA-TO-15 Rev 21

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method blank	Once every analytical batch of 20 or fewer samples	TO-15 / VOA-TO-15 No analyte detected equal to or above the MRL (DoD: No analytes >1/2 MRL; common lab contaminants none detected > MRL)	1) Reanalyze blank 2) Identify and correct problem 3) Reanalyze blank and affected samples 4) Qualify data	Analytst	Bias	No analytes detected less than 1/2 the RL
LCS/LCSD	Once every analytical batch of 20 or fewer samples	TO-15 / VOA-TO-15 Percent recovery (%R) within laboratory generated limits	1) Reanalyze blank 2) Identify and correct problem 3) Qualify data *DoD projects require corrective action for all exceedences 4) Qualify data	Analytst	Accuracy	Per EPA TO-15

Notes:

AECOM	AECOM Technical Services, Inc.	MRL	method reporting limit
DoD	United States Department of Defense	SOP	Standard Operating Procedure
DQI	data quality indicator	TBD	to be determined
LCS	laboratory control sample		

Matrix: Groundwater / Soil

Analytical Group: Anions

Analytical Method/SOP Reference: SW846 9056A SOP145/145A, SM4500PE SOP165

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix	See associated worksheet#15	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix	See associated worksheet#15	If analyte level > 4x spiking level, % recovery cannot be evaluated and no corrective action. If not, sample data qualified.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Lab duplicate	Minimum of 10% of lab samples unless MSD performed	See associated worksheet#15	Associated data qualified, if original result >LOQ	Analyst/ Supervisor	Precision	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	MS	matrix spike
DQI	data quality indicator	QC	quality control
LCS	laboratory control sample	SOP	Standard Operating Procedure
LOQ	limit of quantitation	TBD	to be determined

Matrix: Groundwater / Soil

Analytical Group: Alkalinity

Analytical Method/SOP Reference: SM2320B/ SOP154

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per batch	Result < Limit of quantitation	Reanalyze samples	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
Laboratory Control Sample (LCS)	One per prep batch (LCSD if no volume for duplicate)	80-120%	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Sample Duplicate	One per batch	RPD≤20	If RPD > 20% and result is >LOQ, sample should be reanalyzed. If still high, result is qualified.	Analyst/ Supervisor	Precision	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	QC	quality control
DQI	data quality indicator	SOP	Standard Operating Procedure
LCS	laboratory control sample	TBD	to be determined
LOQ	limit of quantitation		

Matrix: Groundwater
Analytical Group: Methane, Ethane, Ethene
Analytical Method/SOP Reference: RSK-175 / SOP236

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit. For common laboratory contaminants, no analytes detected >LOQ.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank.	Analyst/Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	%R must be within 80%-120%	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	%R must be within 80%-120% and RPD should be $\leq$ 30%	Corrective action will not be taken for samples when recoveries are outside limits and LCS criteria are met unless RPD indicate obvious extraction/analysis difficulties. Then, if sample volume available and <2x holding time, reprep and reanalyze MS/MSD.	Analyst/Supervisor	Accuracy/Bias	Same as Acceptance Limits
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/Supervisor	Accuracy	Same as Acceptance Limits

Matrix: Groundwater

Analytical Group: Sulfide

Analytical Method/SOP Reference: SM4500S2CF/ SOP153

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Method Blank	One per prep batch of 20 or fewer samples of similar matrix; or one per day, whichever comes first	No analytes detected > 1/2LOQ or >1/10 sample concentration or >1/10 regulatory limit.	Investigate source of contamination. Rerun method blank prior to analysis of samples if possible. Evaluate the samples and associated QC: if blank results are above LOQ, report sample results which are < LOQ or > 10X the blank concentration. Reanalyze blank and samples >LOQ and < 10X the blank.	Analyst/ Supervisor	Bias/ Contamination	Same as Acceptance Limits
LCS	One per prep batch of 20 or fewer samples of similar matrix	±20%	If the LCS recoveries are high but the sample results are <LOQ request client approval to qualify and narrate. Otherwise, if sample volume available and <2x holding time, reprep and reanalyze.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
MS/MSD	One per prep batch of 20 or fewer samples of similar matrix	±25%, RPD<20%	Corrective action will not be taken for samples when recoveries are outside limits and LCS criteria are met unless RPD indicate obvious extraction/analysis difficulties. Then, if sample volume available and <2x holding time, reprep and reanalyze MS/MSD.	Analyst/ Supervisor	Accuracy/ Bias	Same as Acceptance Limits
Lab duplicate	Minimum of 10% of lab samples unless MSD performed	RPD<20%	If RPD > 20% and result is >LOQ, sample should be reanalyzed. If still high, result is qualified.	Analyst/ Supervisor	Precision	Same as Acceptance Limits

QC Sample	Frequency & Number	Method / SOP Acceptance Limits	Corrective Action	Person(s) Responsible for Corrective Action	DQI	Measurement Performance Criteria
Results between DL and LOQ	NA	Apply "J" qualifier to results between DL and LOQ.	NA	Analyst/ Supervisor	Accuracy	Same as Acceptance Limits

Notes:

AECOM	AECOM Technical Services, Inc.	QC	quality control
DQI	data quality indicator	SOP	Standard Operating Procedure
LCS	laboratory control sample	TBD	to be determined
LOQ	limit of quantitation		

WORKSHEET #29: PROJECT DOCUMENTS AND RECORDS TABLE

Document	Where Maintained
Sample Collection Documents and Records	
Field Logbook	AECOM San Antonio Office
Groundwater Sampling Logs	AECOM San Antonio Office and ERIS
COC Forms	AECOM San Antonio Office and TBD
On-site Analysis Documents and Records	
Visual Observation Assessment Log	AECOM San Antonio Office
Off-site Analysis Documents and Records	
Air Bills	AECOM San Antonio Office
Laboratory Data Reports	AECOM San Antonio Office and TBD
Laboratory EDD	AECOM San Antonio Office, ERIS and TBD
Laboratory Instrument Calibration Logs	AECOM San Antonio Office and TBD
Laboratory Sample Preparation Logs	AECOM San Antonio Office and TBD
Laboratory Run Logs	AECOM San Antonio Office and TBD
Laboratory Sample Disposal Records	AECOM San Antonio Office
On-Site Field Screening Data	AECOM San Antonio Office
Data Assessment Documents and Records	
DQCRs	AECOM San Antonio Office
Validation Reports (Review and Performance)	AECOM San Antonio Office
Assessment Findings and Corrective Action Responses	AECOM San Antonio Office
Other Documents and Records	
Well Development Logs	AECOM San Antonio Office and ERIS
Equipment Calibration Logs	AECOM San Antonio Office
Waste Manifests	AECOM San Antonio Office
Site Photographs	AECOM San Antonio Office
Personnel Qualifications	AECOM Offices (San Antonio and TBD)
Survey Locations Data	AECOM San Antonio Office and ERIS
Health and Safety Sign-in Sheets	AECOM San Antonio Office
Health and Safety Plan Acknowledgement	AECOM San Antonio Office

Notes:

AECOM	AECOM Technical Services, Inc.	EDD	electronic data deliverable
COC	chain of custody	ERIS	Environmental Restoration Information Systems
DQCR	Daily Quality Control Report	TBD	to be determined

29.1 Long-Term Storage/Location of Project Documents and Records (Listed Above)

As specified in the *QSM*, Section 4.12, "*Control of Records"*, all analytical documents and records shall be retained by the laboratory for a minimum of five years from generation of the last entry in the records. All information necessary for the historical reconstruction of data must be maintained by the laboratory. Records that are stored only on electronic media must be supported by the hardware and software necessary for their retrieval. All analytical data generated from the AECOM on-site field screening laboratory will be handled in the same manner as the definitive-level fixed laboratory data and stored for five years.

All other data generated in the field and reports generated for the project will be stored in both hardcopies and computer readable data files by AECOM in the San Antonio, Texas office for a minimum of five years in accordance with AECOM's contract requirement.

WORKSHEET #30: ANALYTICAL SERVICES TABLE

Matrix	Analytical Group	Sampling Locations / ID Number	Analytical Method	Data Package Turnaround Time	Laboratory/Organization (name and address, contact person, and telephone number)	Backup Laboratory/Organization (name and address, contact person, and telephone number)
Aqueous Solid	Metals Explosives Perchlorate Total Phosphorus Orthophosphate Hexavalent Chromium Ammonia TOC VOCs COD Oil and Grease Ferrous Iron Low level SVOCs Common Anions Alkalinity Dissolved Gases Sulfide	See Worksheet #18	EPA Method SW6010Low EPA Method SW8330B EPA Method SW6850 SM4500-P(B5)E SM4500-PE EPA Method SW7196A SM4500NH3BG SM5310C EPA Method SW8260B EPA 410.4 EPA 1664A SM3500FeD SW8270D SW9056 A SM2320B RSK 175 SM4500S2F	14 days	Empirical Laboratories, LLC 621 Mainstream Drive, #270 Nashville, TN 37228 Marianne Walker 615-345-1115	NA

Matrix	Analytical Group	Sampling Locations / ID Number	Analytical Method	Data Package Turnaround Time	Laboratory/Organization (name and address, contact person, and telephone number)	Backup Laboratory/Organization (name and address, contact person, and telephone number)
Aqueous	Dehalococcoides and Dehalobactor	See Worksheet #18	Dehalococcoides ethogenes/qPCR	14 days	Microbial Insights 10515 Research Drive Knoxville, TN 39732 Marianne Walker 615-345-1115	NA
Air	Volatile Organics	See Worksheet #18	TO-15	14 days	ALS Environmental (Columbia Analytical) 2655 Park Center Drive Ste. A Simi Valley, California 93065 Marianne Walker 615-345-1115	NA

Notes:

COD	chemical oxygen demand	SVOC	semi-volatile organic compound
NA	not applicable	TKN	total kjehldahl nitrogen
OG-HEM	oil and grease-hexane extractable material	TOC	total organic carbon
PCR	polymerase chain reaction	VOC	volatile organic compound
RSK			

WORKSHEET #31: PLANNED PROJECT ASSESSMENTS TABLE

Assessment Type	Frequency	Internal or External	Organization Performing Assessment	Person(s) Responsible for Performing Assessment (Title and organizational Affiliation)	Person(s) Responsible for Responding to Assessment Findings (Title and Organizational Affiliation)	Person(s) Responsible for Identifying and Implementing CA (Title and Organizational Affiliation)	Person(s) Responsible for Monitoring Effectiveness of CA (Title and Organizational Affiliation)
Split Sampling	Periodic	External	USEPA	TBD	Linda Raabe AECOM	Linda Raabe AECOM	Dave Wacker AECOM
QA Oversight	Periodic	External	USACE	TBD	Linda Raabe AECOM	Linda Raabe AECOM	Dave Wacker AECOM

Notes:

AECOM	AECOM Technical Services, Inc.	TBD	to be determined
CA	corrective action	USACE	United States Army Corps of Engineers
QA	quality assurance	USEPA	United States Environmental Protection Agency

WORKSHEET #32: ASSESSMENT FINDINGS AND CORRECTIVE ACTION RESPONSES TABLE

Assessment Type	Nature of Deficiencies Documentation	Individual(s) Notified of Findings (Name, Title, Organization)	Timeframe of Notification	Nature of Corrective Action Response Documentation	Individual(s) Receiving Corrective Action Response (Name, Title, Organization)	Timeframe for Response
Split Sampling	QA Report	Linda Raabe AECOM	90 days	Corrective Action Report	Richard Mayer, USEPA RPM	30 days
QA Oversight	QC Report	Linda Raabe AECOM	1 week	Corrective Action Report	Dave Wacker, PM	30 days

Notes:

AECOM	AECOM Technical Services, Inc.	QC	quality control
PM	Project Manager	RPM	Restoration Project Manager
QA	quality assurance	USEPA	United States Environmental Protection Agency

WORKSHEET #33: QA MANAGEMENT REPORTS TABLE

Type of Report	Frequency	Projected Start Date	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
CLIN 0001A PMP & QASP	Once	7/17/2012	9/29/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
CLIN 0001B Site-Wide Reports	Once	7/16/2012	9/27/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-03 CLIN 0002 RACR/ RC Soils/RD	Once	6/17/2013	11/12/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-16 CLIN 0002 2012 Compliance Monitoring Report	Once	11/8/2012	4/23/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-16 CLIN 0002 RACR/RIP Report	Once	3/24/2013	8/15/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-16 CLIN 0002 Annual RAO/LUC Report	Annual	5/7/2014	6/10/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-17 CLIN 0002 RD/RAWP	Once	8/27/2012	3/13/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-17 CLIN 0002 LTM Plan	Once	5/8/2013	10/10/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-17 CLIN 0002 RACR/RIP Report	Once	5/8/2013	11/6/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army

Type of Report	Frequency	Projected Start Date	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
LHAAP-17 CLIN 0002 Annual RAO/LUC Report	Annual	8/21/2014	9/12/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-37 CLIN 0002 RACR/RIP Report	Once	5/6/2013	2/24/2014	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-37 CLIN 0002 Annual RAO/LUC Report	Annual	7/24/2014	8/28/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-46 CLIN 0002 RACR/RIP Report	Once	2/7/2013	8/29/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-46 CLIN 0002 Annual RAO/LUC Report	Annual	3/2/2014	8/4/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-50 CLIN 0002 RACR/RIP Report	Once	4/30/2013	11/24/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-50 CLIN 0002 Annual RAO/LUC Report	Annual	8/20/2014	7/27/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-58 CLIN 0002 RAWP/EISB Treatability Study	Once	9/24/2012	4/29/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-58 CLIN 0002 RACR/RIP Report	Once	5/13/2013	1/26/2014	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-58 CLIN 0002 Annual RAO/LUC Report	Once	9/3/2014	8/2/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army

Type of Report	Frequency	Projected Start Date	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
LHAAP-67 CLIN 0002 RACR/RIP Report	Once	2/15/2013	9/13/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-67 CLIN 0002 Annual RAO/LUC Report	Annual	6/22/2014	7/5/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
GWTP CLIN 0004 Annual RAO/LUC Report	Annual	6/12/2013	11/15/2016	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
GWTP CLIN 0004 Monthly OM&M Reports	Monthly	7/31/2012	9/28/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
GWTP CLIN 0004 Quarterly GWTP Evaluation Report	Quarterly	12/10/2012	8/10/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-12 CLIN 0005 Annual RAO) Report	Annual	6/12/2013	8/23/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-001-R-01 CLIN 0005 Quarterly Sampling Report	Quarterly	12/10/2012	11/13/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-003-R-01 CLIN 0005 Quarterly Sampling Report	Quarterly	1/3/2013	6/7/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
CLIN 0008 Site Wide CERCLA 121 (c) Five-Year Review Report	Once	11/30/2012	6/18/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
Perimeter Ground Water/Surface Water CLIN 0009 Semi-Annual Perimeter Monitoring Report	Annual	1/22/2013	9/2/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army

Type of Report	Frequency	Projected Start Date	Projected Delivery Date(s)	Person(s) Responsible for Report Preparation (Title and Organizational Affiliation)	Report Recipient(s) (Title and Organizational Affiliation)
LHAAP-04 CLIN 0013 RACR/RIP Report	Once	1/23/2013	8/3/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-18/24 CLIN 0013 RACR/RIP Report	Once	2/14/2013	8/14/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-29 CLIN 0013 RACR/RIP Report	Once	1/30/2013	7/18/2013	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-29 CLIN 0013 Annual RAO Report	Annual	6/11/2014	9/28/2017	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-47 CLIN 0013 RACR/RIP Report	Once	7/21/2013	1/18/2014	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army
LHAAP-29 CLIN 0014 Reports	Once	2/8/2015	7/12/2015	Dave Wacker Project Manager AECOM	Rose Zeiler BRAC Site Manager U.S. Army

Notes:

AECOM	AECOM Technical Services, Inc.	PMP	Project Management Plan
BRAC	Base Realignment and Closure Commission	QASP	Quality Assurance Surveillance Plan
CLIN	contract line item number	RACR	Remedial Action Completion Report
EISB	enhanced in-situ bioremediation	RAO	Remedial Action Operation
GWTP	groundwater treatment plant	RAWP	Remedial Action Work Plan
LHAAP	Longhorn Army Ammunition Plant	RC	Response Complete
LTM	Long-Term Monitoring	RD	Remedial Design
LUC	Land Use Control	RIP	Remedy in Place
OM&M	operations, maintenance and monitoring	U.S. Army	United States Department of the Army

WORKSHEET #34: VERIFICATION (STEP I) PROCESS TABLE

AECOM AECOM Technical Services, Inc.
COC chain of custody
QC quality control
SOP Standard Operating Procedure
U.S. Army United States Department of the Army

Verification Input	Description	Internal/External	Responsible for Verification (Name, Organization)
Planning Documents	Identification of personnel, collection of pre-planning documentation will be checked for accuracy, compliance with SOPs, and completeness	External	Glenn Hilton, AECOM
Analytical Data Package	Laboratory-generated documents of analyses will be reviewed to ensure deliverables meet project requirements and are sufficient for data validation.1	Internal and External	Marianne Walker, Empirical Laboratories Linda Raabe, AECOM
Sampling Documents	COC, communication logs, field notes, field measurements documentation, sampling reports, including locations and conditions will be checked for compliance with SOPs and for accuracy and completeness	External	JoLynn Snow, AECOM
External Reports	Transfer all documentation to the U.S. Army. All deliverables will undergo two levels of QC review.	External	Dave Wacker, AECOM

Notes:
AECOM AECOM Technical Services, Inc.
COC chain of custody
QC quality control
SOP Standard Operating Procedure
U.S. Army United States Department of the Army

WORKSHEET #35: VALIDATION (STEPS IIA AND IIB) PROCESS TABLE

Step IIa/IIb	Validation Input	Description	Responsible for Validation (Name, Organization)
IIa	Sample Collection, Handling	Sample collection and handling will be evaluated by checking COC and lab log-in notes to ensure samples were properly collected, preserved, and shipped to laboratory	Receiving Empirical Laboratories, Nashville, Tennesse
IIa	Field Documentation	Field log books will be checked to ensure all sampling location and condition information was properly recorded and SOPs were followed	Glenn Hilton, AECOM
IIa and IIb	Sample analysis	Data will be validated by AECOM	Linda Raabe, AECOM
IIb	Reports to USEPA	All project documentation will be reviewed against QAPP requirements prior to submittal to the U.S. Army.	Gretchen McDonnell, AECOM

Notes:
IIa- Compliance with methods, procedures, and contracts (see Table 10, page 117, UFP-QAPP Manual, V.1)
IIb- Comparison with measurement performance criteria in the Work Plan (see Table 11, page 118, UFP-QAPP Manual, V.1)

AECOM	AECOM Technical Services, Inc.	SOP	Standard Operating Procedure
COC	chain of custody	U.S. Army	United States Department of the Army
QAPP	Quality Assurance Project Plan	USEPA	United States Environmental Protection Agency

WORKSHEET #36: SAMPLING AND ANALYSIS VALIDATION (STEPS IIA AND IIB) SUMMARY TABLE

Step IIa/IIb [a]	Matrix	Analytical Group	Validation Criterion	Responsible (Name, Organization)
IIa	Aqueous/Solid	Volatile Organic Compounds	Full Validation Procedure for Volatile Organic Compounds by EPA Method SW8260B, using DoD QSM and USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous/Solid	Semi-Volatile Organic Compounds	Full Validation Procedure for Semi-Volatile Organic Compounds by EPA Method SW8270 Low, using DoD QSM and USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous/Solid	Explosives	Full Validation Procedure for explosives by EPA Method SW8330B, using DoD QSM and USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous/Solid	Metals (total and TCLP)	Full Validation Procedure for metals by EPA Method SW6010 Low/7470, using DoD QSM and USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous/Solid	Perchlorate	Full Validation Procedure for perchlorate by EPA Method SW6850, using DoD QSM and USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	Nitrogen, Ammonia	Full Validation Procedure for nitrogen, ammonia by EPA Method SM4500NH3, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	Total Phosphorus	Full Validation Procedure for total phosphorus by EPA Method SM4500-P(B5)E, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	Orthophosphate	Full Validation Procedure for orthophosphate by EPA Method SM4500-PE, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	TOC	Full Validation Procedure for TOC by EPA Method SM5310C, USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Solid	TOC	Full Validation Procedure for TOC by Lloyd Kahn Method, USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	Chromium, hexavalent	Full Validation Procedure for chromium, hexavalent by EPA Method SW7196A, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	COD	Full Validation Procedure for chemical oxygen demand, by EPA Method 410.4 using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	OG-HEM	Full Validation Procedure for oil and grease by EPA Method 1664A, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM

Step IIa/IIb [a]	Matrix	Analytical Group	Validation Criterion	Responsible (Name, Organization)
IIa	Aqueous	Ferrous Fe	Full Validation Procedure for ferrous iron by EPA Method SM3500-FeD, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	DHc/Dehalobactor	Full Validation Procedure for Dehalococcoides using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous/Solid	Common Anions	Full Validation Procedure for ferrous iron by EPA Method 9056A, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	Alkalinity	Full Validation Procedure for alkalinity by EPA Method SM2320B, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Aqueous	Dissolved Gases	Full Validation Procedure for dissolved gases by Method RSK 175 using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM
IIa	Air	Volatile Organics	Full Validation Procedure for Volatile Organic Compounds by TO-15, using USEPA National Functional Guidelines for Data Review	Linda Raabe, AECOM

Notes:
IIa- Compliance with methods, procedures, and contracts (see Table 10, page 117, UFP-QAPP Manual, V.1)
IIb- Comparison with measurement performance criteria in the Work Plan (see Table 11, page 118, UFP-QAPP Manual, V.1)

AECOM	AECOM Technical Services, Inc.	QSM	Quality Systems Manual
COD	chemical oxygen demand	TCLP	Toxicity Characteristic Leaching Procedure
DHc	dehalococcoide	TKN	total kjehldahl nitrogen
DoD	United States Department of Defense	TOC	total organic carbon
FE	iron	USEPA	United States Environmental Protection Agency
OG-HEM	oil and grease- hexane extractable material		

The contractor will request that the project analytical laboratory report definitive-level data for project samples and associated field and laboratory QC samples in USEPA Level IV data packages. The contractor will validate 100% of the data.

The National Functional Guidelines, laboratory derived control limits, and professional judgement will be used in data validation. Data validation will include checking that required QC samples (method blanks, LCS/LCSDs, MS/MSDs, check samples, etc.) have been performed at the required frequency and that the QC acceptance criteria listed in the project-specific QAPP have been met for these samples. Surrogate spikes will be checked to verify that they were performed where required, and that recovery acceptance criteria have been met. Initial and continuing calibration data will be reviewed for completeness and conformance to acceptance criteria. Quantitation limits will be verified, the establishment of control limits will be confirmed, and any quantitation limits that exceed the required reporting limits (RLs) will be identified. Samples will be checked to confirm that sample preparation and analysis were performed within holding times, and that second chromatographic column or mass spectrometer confirmation was performed

where required. Anomaly reports and Nonconformance Reports will be reviewed for acceptable corrective action for all out-of-control events.

All laboratory and field blanks associated with definitive-level data will be reviewed for blank contamination. For some methods, the validator may determine that blank contamination reported as detected between the method detection limit (MDL) and RL may also be used for blank-qualification of data. Sample results less than five times the maximum level found in the associated blanks or less than 10 times the level of contamination for common laboratory contaminants (i.e., methylene chloride, acetone, 2-butanone, 2-hexanone, and common phthalate esters) are qualified according to the blank qualification rules. Results for common laboratory contaminants may be qualified at concentrations less than 10 times the RL even when not found in associated blanks, if the analyte has been documented as an historical contaminant at that laboratory. Blank-qualified results are considered to be non-detected at the reported level, or at the RL for organic compounds reported at less than the RL, according to the blank qualification rules specified in the National Functional Guidelines. If, in the professional judgment of the validator, results in a sample to be blank-qualified are due to real concentrations of an analyte in the sample, the result may be estimated without being considered to be non-detected. In cases where more than one blank is associated with a given sample, qualification should be based upon comparison with the associated blank having the highest concentration of a contaminant. Results for environmental samples must not be corrected by subtracting concentrations of analytes detected in associated blanks.

The General Qualifiers are:

B	Blank contamination
U (not detected)	The analyte was tested for, but was not detected above the MDL, and is considered non-detected (ND) at the reported value. This qualifier is added before any additional qualifiers for all ND results.
UJ	The analyte is ND but the result is an estimate due to QC failure or data quality limitations. UJ indicates detection limit may be biased low.
J	The analyte is positively identified but the reported concentration is an estimate due to QC failure or data quality limitations.
R (unusable)	The result is rejected due to QC failure or data quality limitations. The presence or absence of the analyte in the sample cannot be verified, or the reported result is so severely compromised as to be unusable.
M (estimated)	Matrix effect is suspected.

WORKSHEET #37: DATA USABILITY ASSESSMENT

This worksheet provides procedures, methods, and activities to determine whether data are of the right type, quality, and quantity to support environmental decision-making for the project.

Table 37-1: Considerations for Usability Assessment

Item	Assessment Activity	Responsibility
Data Deliverables and Work Plan	Ensure that all necessary information was provided, including but not limited to, QC sample results and data validation results.	Linda Raabe, AECOM
Sampling Locations, Deviation	Determine whether alterations to sampling locations continue to satisfy the project quality objectives.	TBD, AECOM
COC, Deviation	Establish that any problems with documentation or custody procedures do not prevent the data from being used for the intended purpose.	Kayla Teague, AECOM
Holding Times, Deviation	Determine the acceptability of data where holding times were exceeded.	Linda Raabe, AECOM Kayla Teague, AECOM
SOPs and Methods, Deviations	Evaluate the impact of deviations from analytical and field SOPs and specified methods on data quality.	Linda Raabe, AECOM
QC Samples	Evaluate the implications of unacceptable QC sample results on the data usability for the associated samples. For example, consider the effects of observed blank contamination.	Linda Raabe, AECOM Kayla Teague, AECOM
Matrix	Evaluate matrix effects (interference or bias).	Linda Raabe, AECOM Kayla Teague, AECOM
Meteorological Data and Site Conditions	Evaluate the possible effects of meteorological (e.g., wind, rain, temperature) and site conditions on sample results. Review field reports to identify whether any unusual conditions were present and how the sampling plan was executed.	Glenn Hilton, AECOM
Precision	Evaluate analytical precision measurements. Precision measures the reproducibility of a measurement and is defined as the degree of mutual agreement among independent measurements as the result of repeated application of the same process under similar conditions.	Linda Raabe, AECOM Kayla Teague, AECOM
Accuracy	Evaluation of how close the analytical result is to the true value of the analyte in a sample. Accuracy is a statistical measurement of correctness. It includes components of random error (variability due to imprecision) and systemic error. It therefore reflects the total error associated with a measurement.	Linda Raabe, AECOM Kayla Teague, AECOM
Comparability	Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. Sample data should be comparable with other measurement data for similar samples and sample conditions. This goal is achieved by using standard techniques to collect and analyze representative samples and reporting analytical results in appropriate units.	Linda Raabe, AECOM Kayla Teague, AECOM

Item	Assessment Activity	Responsibility
Representativeness	Determine the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Representativeness is achieved through use of the standard sampling, field, and analytical procedures.	Linda Raabe, AECOM Kayla Teague, AECOM
Completeness	Evaluate the impact of missing information. Ensure that enough information was obtained for the data to be usable (completeness as defined in DQOs documented in this QAPP).	Linda Raabe, AECOM Kayla Teague, AECOM
Critical Samples	Establish that critical samples and critical target analytes, as defined in the Work Plan, were collected and analyzed. Determine whether the results meet criteria specified in the Work Plan.	TBD, AECOM
Data Restrictions	Describe the exact process for handling data that do not meet DQOs (i.e., when measurement performance criteria are not met). Depending on how those data will be used, specify the restrictions on use of those data for environmental decision-making.	Linda Raabe, AECOM Kayla Teague, AECOM
Usability Decision	Determine whether the data can be used to make a specific decision considering the implications of all deviations and corrective actions.	Dave Wacker, AECOM
Usability Report	Discuss and compare overall precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity for each matrix, analytical group, and concentration level. Describe limitations on the use of project data if criteria for data quality indicators are not met.	Linda Raabe, AECOM

Notes:

AECOM	AECOM Technical Services, Inc.	QC	quality control
COC	chain of custody	SOP	Standard Operating Procedure
DQO	data quality objective	TBD	to be determined
QAPP	Quality Assurance Project Plan		

37.1 Summary of the Usability Assessment Process and Procedures

A usability assessment to determine how well the data collected on this project support the project objectives and decisions to be made will be performed by a project team (e.g., PM, QA Manager, Hydrogeologist, Geochemist, field staff, and Project Chemist) from AECOM.

All definitive-level analytical data will be sent to AECOM for data validation. AECOM will determine the usability of the analytical data and will identify any limitations on the use of the data. Only definitive-level data that has undergone verification and validation will be used to assessments and study decisions. All raw data and electronic copies screening-level data will be retained by AECOM in the event data reconstruction/validation is deemed necessary.

The analytical results of the sampling will be compared to the DQOs presented on Worksheets #12 and #28 to determine whether the MPC were met. Upon completion of the verification and validation processes noted on Worksheet #34 and Worksheet #35, the DQIs will be evaluated for each analytical group. Based on the results of this examination, conclusions regarding the

validity and usability of data for each analytical group will be drawn. A Data Quality Assessment Report will be prepared by the Data Validator and provided to the PM within 21 days of receipt from the laboratory. Overall measurement error (sampling plus analytical) will be assessed as noted below.

37.2 Error Associated With the Project

Measurement error will be evaluated by reviewing sampling design, sampling locations, and sample collection methods. AECOM will evaluate QC samples (see Worksheet #20) to assess the overall measurement error associated with the project.

37.3 Personnel Responsible For Performing the Usability Assessment

- Linda Raabe and Kayla Teague will be responsible for performing the analytical data usability assessment.
- Linda Raabe the AECOM Project Chemist and Kayla Teague, AECOM Chemist, will also perform a usability assessment of the validated data and screening-level data. This usability assessment will include (1) review of accepted or rejected data, (2) review of data qualifiers, (3) review of laboratory surrogate recoveries, (4) review of LCSs, and (5) consultation with the analytical laboratory.
- Dave Wacker, the AECOM PM, will use the results of both usability assessments to determine whether the data generated during the investigation can be used to answer the principal study questions.

37.4 Documentation to Be Generated During Usability Assessment and How Results Will Be Presented

AECOM will generate validated data packages to be presented in the report. The usability assessment will generate a letter report describing the means and methods of the usability assessment and the results. All data sets will be evaluated using precision, accuracy, representativeness, comparability, and completeness criteria developed during the site-specific DQO development process and summarized below.

Precision and Accuracy: Precision and accuracy are evaluated using data quality indicators, such as MS/MSDs, LCSs, and surrogates. Precision and accuracy of the data set are considered acceptable after integration of qualification of estimated (i.e., estimated [J] and non-detected estimated [U]) results.

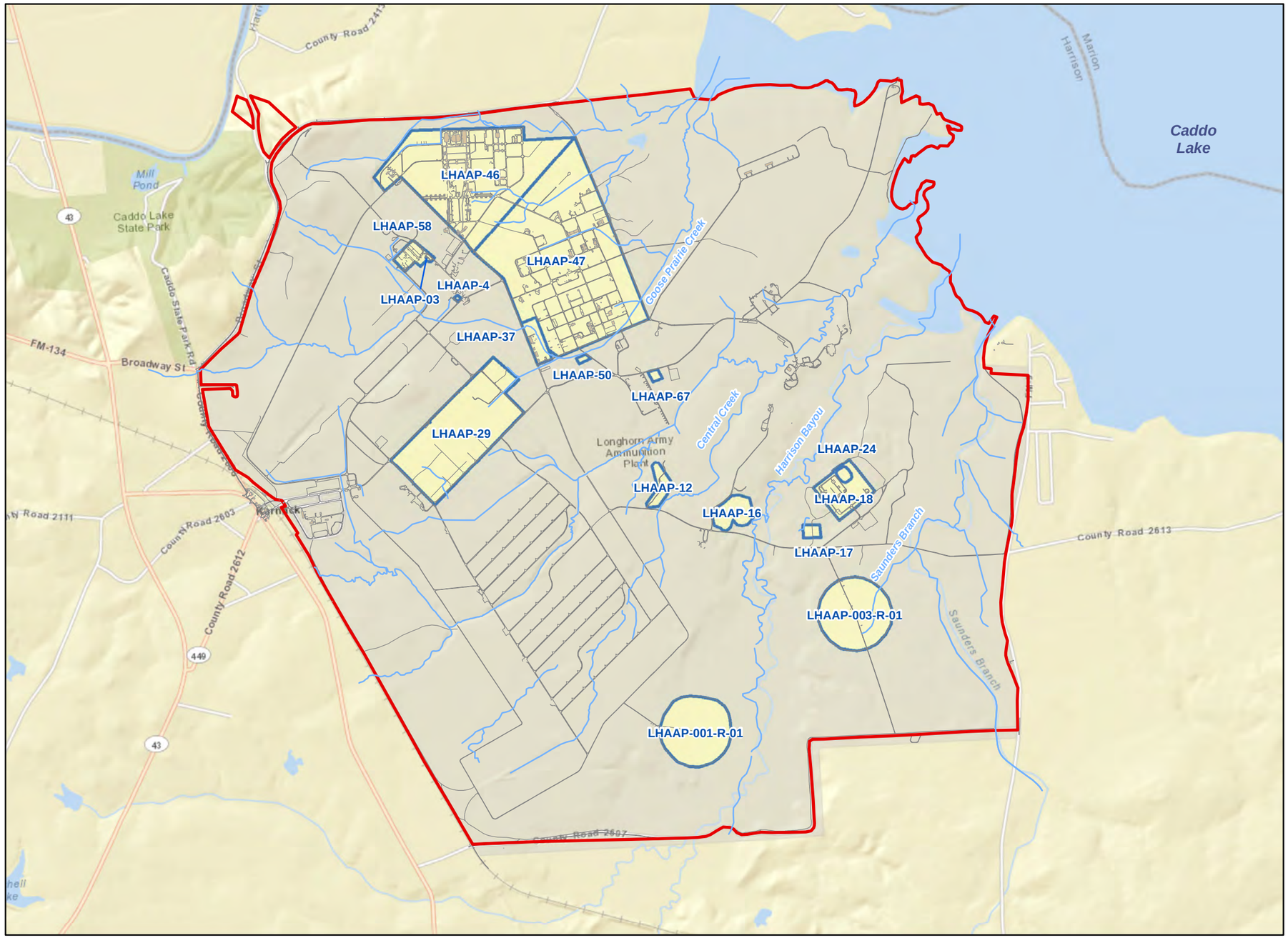
Representativeness: All samples for each method and matrix are evaluated for holding time compliance. All samples are associated with a method blank in each individual sample delivery group. Representativeness of the project data is considered acceptable after qualification for blank contamination.

Comparability: In general, data comparability is evaluated through the collection and analysis of field duplicates and field blanks. The laboratory will use standard analytical methods for their analyses. The analytical results will be reported in correct standard units. Holding times, sample preservation, and sample integrity will be within QC criteria.

For the purpose of this investigation, comparability between samples run on both field screening instruments (intra-laboratory precision) and comparability of field screening-data with fixed base definitive-data (inter-laboratory accuracy and precision) will also be performed to enhance the comparability assessment.

Completeness: The overall completeness will be determined by the total number of analytes reported versus the number of sample results rejected in percent. The completeness percentage based on rejected data should meet the 90% goal.

Uncertainty Discussion of Reporting Limits: The magnitude of the laboratory reporting limits might have an effect on the results of any environmental investigation. For instance, if a chemical is present in an environmental medium at concentrations below the highest reporting limit and below the screening criteria, then that chemical should be eliminated from consideration as a contaminant of potential concern (COPC). However, it is also possible that a chemical is present below the reporting limit and above the screening criteria; therefore, the assumption that the chemical is not present would potentially result in an underestimation of the potential impact of contamination. As a result, the chemical should not be eliminated from the COPC list and may require further evaluation.



Legend

- Streams
- Roads
- LHAAP Boundary
- Site Boundaries
- Lake/Pond

LHAAP Primary TO DS01 Sites

LHAAP-03	Building 722 Paint Shop
LHAAP-04	Pilot Wastewater Treatment Plant
LHAAP-12	Landfill 12
LHAAP-16	Landfill 16
LHAAP-17	Burning Ground No. 2/Flashing Area
LHAAP-18	Burning Ground No. 3/Unlined Evaporation Pond
LHAAP-24	Burning Ground No. 3/Unlined Evaporation Pond
LHAAP-29	Former TNT Production Area
LHAAP-35	Sumps Various
LHAAP-36	Explosive Waste Pads
LHAAP-37	Chemical Laboratory Waste Pad
LHAAP-46	Plant Area 2
LHAAP-47	Plant Area 3
LHAAP-50	Former Sump Septic Tank
LHAAP-58	Maintenance Complex
LHAAP-67	Aboveground Storage Tank Farm
LHAAP-001-R-01	South Test Area/Bomb Test Area
LHAAP-003-R-01	Ground Signal Test Area

0 1,500 3,000 6,000
Feet

AECOM

Figure 1
LHAAP Site Locations Map
Longhorn Army Ammunition Plant
Karnack, Texas

60256135 July 2013

Appendix C: Standard Operating Procedures

Attachment 1 – Collection and Field Screening of Soil Samples

Attachment 2 – Groundwater Sampling

Attachment 3 – Monitoring Well Development

Attachment 4 – Water Level Measurements

Attachment 5 – Subsurface Soil Sampling by Split Spoon and Continuous Split Barrel Samplers

Attachment 6 – Surface Soil Sampling

Attachment 7 – Surface Water Sampling

Attachment 8 – Packaging and Shipment of Environmental Samples

Attachment 9 – Decontamination of Field Equipment

Attachment 10 – Investigation Derived Waste

Attachment 11 – Monitoring Well and Boring Abandonment Procedures

Attachment 12 – Monitoring Well Installation Procedures

Attachment 13 – Combined Cone Penetrator and Membrane Interface Probe (CPT/MIP) Investigations

Attachment 14 – Underground Utility Clearance

Attachment 15 – Field Calibration Checks of Multiparameter Water Quality Meter

Attachment 16 – Direct Push Technology

Attachment 17 – Chloride Analysis Using Titration Strips

Attachment 18 – Water Depth and Velocity Measurements

Attachment 19 – Discharging Treated Water into Harrison Bayou

Attachment 20 – Sulfate Analysis Using Hach DR 3900

Attachment 21 – Air Sampling

Standard Operating Procedure

Collection and Field Screening of Soil Samples

Attachment 1

Revision No.: 2

Revision Date: June 2014

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1.0 Purpose and Summary

This Standard Operating Procedure (SOP) establishes guidelines and procedures for use by field personnel in collection and field screening of hand-augered, grab, and sleeve-lined split-spoon soil samples from surface or subsurface soils, or sediments at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions. The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

The use of field screening methods for hand-augered, grab, or sleeve-lined split-spoon samples allows field teams to develop a general understanding of contaminant profiles with the objective of optimizing confirmation sampling activities. Consistent sampling procedures help to ensure uniformity of results and to reduce either false positives or negatives.

2.0 Health and safety considerations

2.1 The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the site specific Health and Safety Plan (HASP). In the absence of a site-specific HASP, work will be conducted according to the Health and Safety Policy and Operations Manual and/or direction from the Regional Health and Safety Manager.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Direct Push Technology (DPT): An insertion tool aided by a pneumatic hammer to obtain discrete soil and groundwater samples.

Terra Core™ Sampler: A disposable volumetric sampling device used for collecting soil samples for VOC analyses.

Hand Auger: A hand-operated device used for collecting shallow subsurface soil samples. Several types of hand augers are available: screw-type augers, barrel augers, tube type augers, and hand-held power augers. The basic operation of a hand auger involves turning the auger repeatedly while applying pressure so that it goes down into the soil. Soil samples are collected either from the cuttings (screw-type) or the barrel (barrel or tube-type) of the auger.

Split Spoon Sampler: The split-spoon sampler consists of two split-barrel halves, a drive shoe, and a sampler head containing a ball ‘n check valve, all of which are threaded together. The sampler is commonly 2 to 3 inches in outside diameter and 2-feet in length. The sampler is threaded to a driving rod and either pushed or hammered into the ground to obtain a soil sample.

Continuous Split Barrel Sampler: Similar to the split-spoon sampler but larger in size, about 3.5 inches in outside diameter and 5-feet in length. The sampler is threaded to the center rod of the hollow-stem auger and seated in the center of the lower-most auger slightly ahead of the drill bit. The sampler is pushed downward as the augers advance into the subsurface.

5.0 Procedures, Equipment and Supplies

5.1 Required Records and Forms

- Field Log Book

- Sample labels and chain-of-custody forms
- Sample collection log (SCL)
- Material safety and data sheets (MSDS) Procedures

5.2 Recommended Materials, Equipment, or Supplies

- Indelible black-ink pens and markers
- Personal protective equipment (PPE)
- Gloves, nitrile
- boring logs
- Paper towels
- Radio, two-way, hand held or cellular phone
- Aluminum Foil
- Portable organic vapor detector (i.e., photoionization detector [PID] or flame ionization detector [FID])
- Clean stainless steel spoon, spatula, or putty knife
- Certified clean glass sample container or zip-top type plastic bags

5.3 General Requirements

The collection of field-screening samples can be accomplished by several types/sizes of sampling devices (e.g., hand auger, Geoprobe sampler system, or split-spoon samplers). However, the greater the number of analyses to be performed in the field, the greater the volume of soil that will be required for laboratory analyses. The following procedures outline the collection methods from three of the most common sample retrieval devices that allow for soil analyses.

1. Verify that all personnel have read and understood the approved site-specific health and safety plan and have the proper training and certifications required under The Occupational Safety and Health Administration.
2. Sample locations are to be marked and proper utility clearances obtained prior to sampling event. See Attachment 14 Underground Utility Clearance in Appendix C to the Installation-Wide Work Plan.
3. Verify the site location by existing maps and surface features. Delineate the boundaries of the work site with flagging or other means to prohibit access to unauthorized personnel.
4. Check to see that all the necessary equipment (including PPE) is available at the site, is in good working condition, and has been properly decontaminated.
5. Check that all monitoring equipment is properly calibrated and operating.
6. Dispose of the soils/sediment and containers as stated in the Work Plan and Attachment 10, Investigation Derived Waste in Appendix C to the Installation-Wide Work Plan.
7. Follow the general procedures for collection of subsurface soil samples as defined in Attachment 5 Subsurface Soil Sampling in Appendix C to the Installation-Wide Work Plan.

5.4 See Attachment 16 Direct Push Technology Sampling in Appendix C to the Installation-Wide Work Plan for DPT Sampling procedures.

5.5 Specific Requirements for Hand Augering

1. For sites with VOC impacts, using gloved hands or spatula/spoon, fill either a clean container or zip-top bag approximately one-half to two-thirds full with soil/sediment and tightly seal the zip-top type bag or tightly cap the clean container with a piece of aluminum foil.

2. Place the remainder of the soil/sediment in aluminum foil, glass jar or other appropriate container within minimal headspace. Store in a shaded location or container to preserve volatile content until determined whether collection of analytical samples of the material is required.

3. Properly identify the sample and record it on the boring log.

4. Allow the sample to set for approximately 5 minutes in a warm environment (e.g., the sun or a heated car).

5. Pierce the aluminum foil or the zip-top type bag with the sample probe of the organic vapor detector (FID or PID) and record the highest initial reading from the container's headspace on the boring log.

6. Obtain soil samples for laboratory analyses, based on the vapor screening results. (Requirements relating to sampling requirements [sample jar/container type, sample preservation requirements, method numbers and holding times] can be found in the Quality Assurance Project Plan, Appendix B to the Installation-Wide Work Plan.)

   a. Samples requiring VOC analysis (per the site and/or investigation specific workplan) will always be collected first.

   b. Other analyses that do not require sample homogenation (per the site and/or investigation specific workplan) will be collected second. This may include SVOC, PAHs, TPH or other analysis as designated in the site and/or investigation specific workplan.

   c. Samples requiring soil homogenation (per the site and/or investigation specific workplan) will be collected last. This may include metals analysis as designated in the site and/or investigation specific workplan.

5.6 Specific Requirements for "Central Mine Equipment" Split-Spoon Sampler (24-inch or 5-foot)

1. Samples requiring VOC analysis (per the site and/or investigation specific workplan) will always be collected first.

2. Other analyses that do not require sample homogenation (per the site and/or investigation specific workplan) will be collected second. This may include SVOC, PAHs, and/or TPH as designated in the site and/or investigation specific workplan.
3. Samples requiring soil homogenation (per the site and/or investigation specific workplan) will be collected last. This may include metals analysis as designated in the site and/or investigation specific workplan.

5.7 Specific Requirements for Geoprobe Sampling System

1. Extrude sample with liner out of sampling tube. Cut open liner to expose soil.
2. Using gloved hands or spatula/spoon, fill either a clean container or zip-top bag approximately one-half to two-thirds full with soil/sediment and tightly seal the zip-top type bag or tightly cap the clean container with a piece of aluminum foil.
3. Cover the remainder of the soil/sediment with aluminum foil. Store in a shaded location or container to preserve volatile content until determined whether collection of analytical samples of the material is required.
4. Properly identify the sample and record it on the boring log.
5. Allow the sample to set for approximately 5 minutes in a warm environment (e.g., the sun or a heated car).
6. Pierce the aluminum foil or the zip-tip type bag with the sample probe of the organic vapor detector (FID or PID) and record the highest initial reading from the container's headspace on the boring log.
7. Based on the vapor screening results obtain soil samples for laboratory analyses.
   a. Samples requiring VOC analysis (per the site and/or investigation specific workplan) will always be collected first.
   b. Other analyses that do not require sample homogenation/compositing (per the site and/or investigation specific workplan) will be collected second. From the composited material, samples required for analysis by the site-specific work plan will be collected in order of increasing holding time as shown in Worksheet #19 of the LHAAP Quality Assurance Project Plan.

5.8 Records

All soil screening and sampling data will be recorded in the boring log. General information regarding the screening and sampling of the soil borings will be entered in the field log book, to include the daily and any required secondary calibrations of the FID or PID unit. The field log book entries will be recorded chronologically and the time of the entry recorded first. All field log book continuation pages will be sequentially numbered and the last page recorded for the day will be signed and dated by the recording technician.

Records generated as a result of this SOP will be controlled and maintained in the project record files.

6.0 Exception Provisions

Headspace analysis is limited by potential loss of volatile organic compounds during method execution.

7.0 Cross Reference

Annual Book of ASTM Standards, Standard Guide for Soil Gas Monitoring in the Vadose Zone, D5314.

HAZWRAP, 1996. Document No. DOE/HWP-100, Standard Operating Procedure 2A and 2B, Collection and Field Screening of Hand-Augered and Grab Samples and Sampling and Field Screening of Sleeved Soil Samples.

SOP-Attachment 5 - Subsurface Soil Sampling by Split Spoon

SOP-Attachment 9 - Decontamination of Field Equipment

SOP Attachment 14 – Underground Utility Clearance

SOP-Attachment 16 - Direct Push Technology Sampling

8.0 Tables

None

9.0 Figures

None

10.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Figure 1 - FIELD ACTIVITY DAILY LOG

DATE:	**NO:**	**SHEET OF**
PROJECT NAME:	**PROJECT NO.:**	
FIELD ACTIVITY SUBJECT:		
DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:		
VISITORS ONSITE:	**CHANGES FROM PLANS AND SPECIFICAITONS AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:**	
WEATHER CONDITIONS:	**IMPORTANT TELEPHONE CALLS:**	
IT PERSONNEL ONSITE:		
SIGNATURE:		**DATE:**

Standard Operating Procedure

Groundwater Sampling Procedures

Attachment 2

Revision No.: 2

Revision Date: June 2014

Contents

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1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines and procedures for use by field personnel in collecting a sample of groundwater from a permanent or temporary well at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either: the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP. Deviations from the SOP will be captured in field documentation and noted in reports submitted to regulatory agencies. A consistently implemented groundwater sampling procedure will help ensure data comparability between different sampling events and between sites. One of the methods presented below shall be used to collect groundwater samples. The method to be used shall depend upon the site conditions or requirements of the work plan. Low-flow groundwater purge methods shall be used unless other methods are specified or approved for special circumstances.

1. Low-flow purge method: The method involves purging the well at low-flow rates until water quality parameters stabilize and collecting the sample volume of groundwater at the same low-flow rates. This method should be used by default unless the site conditions or the work plan require using a different method. A bladder pump is preferred for low flow sampling; however, other pumps (e.g., peristaltic pump) may be acceptable depending upon the objective of the sampling.

2. Volume purge method: The method involves purging a fixed number of well volumes using a bailer or pump. Purging of groundwater from the well casing is continued until a minimum of 3 well volumes have been removed and the water quality parameters have stabilized. This method shall be used in lieu of the low-flow method, only if warranted by the site conditions (e.g., exceptionally low recharge rate). A bailer may be used for collecting required sample volume of groundwater from a well that goes dry even at the slowest achievable pumping rate. In such a case, the well is pumped dry and sample is collected with a bailer within 24 hours (hrs). This method shall be used only if specified in the work plan or approved by the AECOM project manager or technical lead.

The low-flow purge and sample method shall be used as a default method for collecting groundwater samples for chemical analysis. The use of the second method will be restricted only to special circumstances, either as specified in the work plan or if warranted by site conditions. If site conditions warrant the use of the second method, prior approval from the AECOM project manager or technical lead is required and the approving person must be identified in the sample collection log. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

1.1 Low-flow Purge and Sample

Introduction. The low-flow (minimum drawdown, micropurging) sampling method is based upon the premise that a pump located within the screened interval of a well and pumping at a rate corresponding to the hydraulic conductivity of the formation, will rapidly establish a horizontal laminar flow of groundwater and withdraw fresh formation water without significant mixing or dewatering of the stagnant casing water in the well (U.S. Army Corps of Engineers, 1995). The low flow method aims to minimize well water turbidity which may be caused by re-suspension of well sediments or additional development of the formation during high speed pumping.

Establishment of a low flow regime will be ensured by carefully monitoring for any groundwater drawdown during purging. Excessive drawdown indicates that the pump is withdrawing stagnant casing water instead of pulling fresh groundwater from the formation surrounding the well. The maximum drawdown allowed will be 0.3 feet (ft) (4 inches [in]). During purging, the flow rate will typically be maintained within the range of 0.1-0.5 liter per minute (L/min). The flow rate will be decreased further if the drawdown exceeds 0.3 ft (4 in). Flow rates up to 1 L/min may be used in purging some high yielding regolith aquifers, if the drawdown remains within the allowable limit of 0.3 ft (4 in). Flow rates greater than 1 L/min may be allowed in bedrock wells where the well may be screened across a cavity, with the limitation of the maximum drawdown. However, the flow rate in all cases must be slowed down to 0.1 to 0.3 L/min during collection of the sample volume to prevent turbulence and/or aeration of collected groundwater.

If excessive drawdown is noted using the lowest possible pump rate, then the low-flow method is not applicable. In such a case, the well will be pumped dry once and a sample will be collected with a bailer as soon as adequate quantity of water for samples is available, but within 24 hrs of well evacuation.

2.0 Health and Safety Considerations

2.1 This section presents the generic hazards associated with groundwater sampling and is intended to provide general guidance in preparing site-specific health and safety documents. The site-specific Health and Safety Plan will address additional requirements and will take precedence over this document. Note that groundwater sampling usually requires Level D personal protection unless there is a potential for exposure to airborne site contaminants.

2.2 Health and safety hazards include but are not limited to the following:

- Slip, trips, and falls in tall grasses over obstacles, and muddy conditions. Review terrain hazards prior to conducting these operations. Ensure there is a safe means of access/egress to the sampling location.
- Dermal exposure to potentially contaminated water. Ensure that proper personal protective equipment is used to mitigate the impact of splashes of water to skin and/or eyes.
- Use appropriate ergonomic techniques when inserting or retrieving equipment from the lake or stream to preclude injury to the arms, shoulders or back.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.3 Field Team

All members of the field team (samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring that all team members also perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Bailer. A bailer is an enclosed cylindrical tube containing a mechanical ball check-valve at the bottom. Lowering the bailer into water causes the ball to move away from the opening at the bottom of the bailer, allowing water to enter the cylinder. Raising the bailer through the water causes the ball to settle, creating a seal to trap the water so that it can be removed from the well.

Bladder Pump. A bladder pump is an enclosed cylindrical tube containing a flexible membrane bladder. Well water enters the bladder through a one-way check-valve at the bottom. Gas is forced into the annular space (positive displacement) surrounding the bladder through a gas supply line. The gas displaces the well water through a one-way check-value at the top. The water is brought to the surface through a water discharge line. The gas (air or nitrogen) is supplied by compressors or compressed gas cylinders.

Peristaltic Pump. A peristaltic pump is a low volume pump consisting of a rotor and ball bearing rollers. Tubing placed around the rotors is squeezed by the rotors as they revolve. The squeezing produces a wavelike contractual movement which causes water to be drawn through the tubing. The peristaltic pump is limited to sampling at depths of less than 25 ft.

Purging. The process of evacuating static water in the monitoring well to allow formation water to flow into the well. The aim of purging a well before sampling is to obtain a sample that is representative of the groundwater in the soil or rock formation immediately surrounding the well

casing. Purging can be accomplished either by utilizing low-flow purge or volume purge methods. In the low-flow purge method, water is pumped at a slow rate to establish a horizontal laminar flow to draw water from the formation without drawing in the stagnant casing water. Volume purge involves evacuating a minimum of three well volumes of water to ensure that all stagnant water has been removed from the well.

Water Quality Parameters. Chemical and physical properties of groundwater measured during well purging. The parameters are recorded periodically until they have stabilized. This is done to ensure that a representative groundwater sample has been collected and to document the ambient subsurface conditions at the time of sampling. Typical field parameters include pH, oxidation-reduction potential, temperature, dissolved oxygen, conductivity, and turbidity. The measurements are made at specified intervals during purging and immediately documented on appropriate sample collection logs in the field.

5.0 Procedure

5.1 Required Records and Forms

1. Monitoring Well Sample Collection Form (see Figure 1)
2. Chain-of-Custody Form
3. Sampling and Analysis Plan
4. Material Safety Data Sheets
5. Field Log Book
6. Well Construction Logs/Boring Logs, if necessary to determine specific depth of screen to be sampled.

5.2 Recommended Materials, Equipment, or Supplies

The following supplies are recommended for low-flow purge and sample method. Other supplies as needed in addition or in-lieu of those listed below are specified in respective sections.

1. Personal protective equipment as required by the site-specific health and safety plan
    a. Gloves (nitrile or latex)
    b. Safety glasses with side shields
    c. Photoionization Detector
    d. Radio (two-way, hand-held or cellular phone)
2. Keys for (un)locking wellhead protective casing
3. Paper towels
4. Pens (waterproof)
5. Calculator
6. Pipettes
7. Water Level Indicator

8. Sheeting (polyethylene)
9. Pump (bladder)
    a. Stop watch (or watch with second hand)
    b. Pump Control Box
    c. Compressor, air
    d. Tubing, Teflon ® lined polyethylene discharge bundled with polyethylene air tube
    e. Graduated cylinder or measuring cup,
    f. Filters, high capacity in-line sample filter, sized according to work plan specifications (if required)
    g. Filters, syringe-type, sized according to work plan specifications (if required)
    h. Filtration units (disposable), and hand-operated vacuum pump (if needed in-lieu of in-line filtration)
    i. Field parameter meter with flow-through cell or equivalent
10. Sample bottles with appropriate labels
11. Cooler with ice and packing materials
12. Decontamination solutions; non-phosphate detergent, rinse water, deionized water
13. Drum, 55-gallon (gal), or other appropriate groundwater containment
14. Trash bags, large plastic
15. Decontamination buckets and spray bottle

5.3 General Requirements

5.3.1 Decontamination

All sampling equipment (i.e., pump, bailer, water discharge tubing, support cables, water level indicator, flow-through cells, etc.) likely to come in contact with the purged groundwater shall be decontaminated before and after each use and in between wells. Refer to the decontamination SOP for complete procedures.

5.3.2 Other Requirements

1. Provide shade for the spooled tube when a sampling event occurs during summer months and the sample location is in full sun. Otherwise, the tube may act as an effective heater, warming the groundwater sample and increasing the potential for volatilization.
2. The portable generator/compressors shall be placed downwind from the well being sampled.
3. Store field parameter measurement “instruments” in shade during transportation and at the sampling site. The instruments may give inaccurate readings if left under full sun.
4. To the extent possible, groundwater sampling shall be conducted so as to sample upgradient, presumably “clean” wells first.
5. All personnel involved in sampling shall wear appropriate health and safety clothing and gear, including clean nitrile gloves, in accordance with the site-specific health and safety plan.

5.4 Specific Requirements for Low-Flow Sampling

Follow steps given below.

1. Determine total well depth through review of well construction logs.
2. Measure the static water level with an electric water level indicator.
3. Measure total well depth using the electric water level indicator probe.
4. Based on the well design information, subsurface geology, and the measured water level, determine the location of the pump intake using the guidelines given below. Review well boring log to determine whether areas of relatively higher conductivity (K) exist within the screned interval.
    a. If a zone with a relatively high K is present in the screened interval, place the pump intake within this zone. A high K zone may be a sandy or gravel bearing unit within an overall clayey unit or a fracture zone within the bedrock. If the high K zone is near the bottom of the screen, the pump intake should be placed above the well bottom as far as is reasonable.
    b. If a high K zone is not present and the screen is completely submerged, place the pump intake near the middle or slightly above the middle of the screen.
    c. If a high K zone is not present and if the water level is below the top of the screen, place the pump near the middle of the water column. The pump intake should be placed above the well bottom as far as is reasonable.
5. Connect the safety cable, discharge tube, and air tube to the bladder pump. The discharge tube will be Teflon ® lined polyethylene and of appropriate length to span the distance from the pump to the surface to discharge purged groundwater into designated waste containment. For example, a 100-ft long tube may not be used in sampling a 30-ft deep well; instead a 50-ft length will be used. Using an appropriate length of tube will minimize the amount of decontamination fluids generated and lessen the opportunity for chemical and physical changes in the water due to contact with the spooled tube.
6. Gently lower the pump to the appropriate intake depth so as to minimize mixing of stagnant casing water and re-suspension of well bottom sediments. All efforts will be taken to limit disturbance of the stagnant water column above the screened interval, as disturbance of the stagnant water column may purging time required to reach stabilization time. Secure the pump at the desired depth by clamping the support cable to a stable location at the well head.
7. Lower an electric water level indicator (with an audio and visual alarm) again into the well, measure and record the water level. The water level may be temporarily elevated because of the insertion of the pump into the well.
8. Make proper connections for the pump. Attach the air supply line to the pump controller. Connect the pump discharge tube to the flow through cell of the water quality meter and place the discharge from the flow cell into the designated waste containment.
9. Calibrate water quality meters and place probes into the flow through cell.
10. Measure the water level in the well.
11. Start the pump and set at the lowest setting. Gradually increase the flow rate. Constantly monitor the drawdown as the flow rate is increased. If the drawdown exceeds 0.3 ft, indicated by visual or audio alarms on the water level indicator, decrease the flow rate appropriately.
12. Monitor the pump flow rate in milliliters per minute (mL/min) using a stop watch (or second hand) and a graduated measuring container. The target flow rate is 100 to 500 mL/min (0.1 to 0.5 L/min), which

may be increased to 1 L/min (unconsolidated formation well) or greater (bedrock well), while staying within the maximum drawdown limitation of 0.3 ft.

13. Measure water quality indicator parameters every 3 to 5 minutes. The parameters and their tolerance limits are provided in Table 1 and discussed further in a subsequent section. The measurements shall be recorded on the groundwater sampling form. All measurements shall be recorded in units shown on the form. If measurements are made in different units, these units must be clearly documented on the form.
14. Once water quality indicator parameters stabilize (three consecutive readings within acceptable variability, see Section 5.7), disconnect the discharge tube leading from the well or pump to the flow through cell for sample collection. Confirm prior to sample collection that the tubing being used for sample collection does not encounter the flow through cell. Never collect a sample from the outflow of the flow through cell. Collect samples at 100 to 500 mL/min purging rate.
15. If the recharge rate of a well fails to sustain the lowest possible flow rate of the pump, causing an excessive drawdown, purge the well dry one time. Remove the pump from the well and allow the well to recover until adequate water for samples is available.
16. Use a bailer to collect samples within 24 hrs. This is especially important for wells that have historically yielded turbid samples. Up to 24 hrs may elapse between purging the well dry and sample collection to allow the well to recharge to an adequate level and to allow any silt to settle out of the water column.

5.5 Specific Requirements for Volume Purge and Sampling Using a Bailer or Submersible Pump

The following procedures shall be applicable to the volume purge of a well. The volume purge method shall be used only under special circumstances. Prior approval from the technical lead or the site manager shall be obtained and documented on the sample collection form before using this method.

1. Prepare and decontaminate equipment as per decontamination SOP.
2. Measure the static water level and the total well depth with an electric water level indicator.
3. If purging well with a bailer:
    a. Use Teflon® bailers if the bailers are to be decontaminated between wells and re-used, or other disposable bailers.
    b. Use disposable twine with the bailer. Do not decontaminate and reuse plastic twine. Only Teflon® covered steel cable may be decontaminated and reused at another well.
    c. To start purging, gently lower and raise the bailer in the water column until the bailer is full. Remove bailer from well and discharge to designated containment. Repeat, until a sufficient volume of water has been purged from the well.
    d. Record water quality parameters at least twice for each well volume evacuated. Due to the turbidity that can be generated during purging with a bailer, any silt or other particulates present in the purged water may need to settle prior to collecting a turbidity reading.
    e. Note: DO cannot be properly measured utilizing bailer samples because DO changes rapidly upon exposure to atmospheric conditions.
4. If purging with a submersible pump:
    a. Lower the pump gently to the bottom of the well.

b. Complete power connections and begin purging.

c. Record water quality parameters at least twice for each well volume evacuated.

d. Purge until at least three well volumes have been evacuated and the well parameters have stabilized or the well is bailed dry. Proceed with sample collection once parameter stabilization and low turbidity values (Table 1) have been achieved. If the well is bailed dry, wait until adequate water is available in the well and proceed with sample collection.

5. Collect the samples in the analyte order provided in this document or per applicable work plan or per the direction of the site manager.

6. If collecting a field-filtered sample for metals (i.e., turbidity is equal to or greater than 10 NTU), use an inline disposable filter. For each filtered sample submitted to the laboratory for metals analysis, a corresponding raw (unfiltered) water sample must also be submitted to analysis. Alternatively, send an unpreserved (no nitric acid added) sample to the laboratory. The sample will be filtered in the laboratory before analysis. This should be designated on the COC and recorded on the groundwater sampling.

7. If collecting a field-filtered sample for perchlorate, use a disposable 0.2 micron syringe filter with a disposal syringe (5cc to 20 cc) to remove perchlorate-digesting bacteria. Multiple syringe draws will be required to prepare the required 125 ml of sample for analysis. Field filtration of the sample should be noted on the groundwater sampling form.

8. Record all pertinent information on the groundwater sampling form, identifying the sampling method used (i.e., volume purge and sample with a bailer) in the “Comments” field. Any fields in the form not applicable to the method used shall be marked “NA.”

5.6 Disposal of Purge Water

The water purged from the well is considered investigation-derived waste. All purge water shall be containerized according to the work plan and in accordance with all local, state, and federal laws.

5.7 Specific Requirements for Water Quality Parameter Measurements

Water quality parameters to be monitored during the purge process shall include pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen (DO), and turbidity. Measurements shall be made at intervals required by the specific purge method used. If using a pump, a flow-through cell will be used to measure field parameters at the discharge from the pump at a frequency specified in the sample collection log. If using a bailer for purging, field parameters shall be measured at least twice per well volume evacuated. (DO readings will not be collected from bailed water, but only from a flow through cell.)

The goal of the purging process is to obtain a groundwater sample that is representative of the surrounding aquifer. Field parameters are the indicators used to determine when the formation water is being removed (i.e., “stable” groundwater quality parameters). The normal ranges of field parameters are indicated in Table 1. Stabilization of parameters is required before analytical samples may be collected, irrespective of the method used. Field parameter stabilization is defined as three consecutive readings within the criteria presented in Table 1.

Professional judgment should be used in evaluating field measurements. For example, if DO readings are in the 5 to 7 mg/L range, then 10 percent is a reasonable fluctuation. But if DO is in the 0.5 to 1 mg/L range, then fluctuations within 10 percent are perhaps overly stringent and 20-50 percent variation may be allowed. The same is true for conductivity and the 10 millivolt (mV) stabilization standard for oxidation-reduction potential. If after 3 well volumes have been purged, all but one or two

parameters have stabilized, but are relatively close to their respective target bounds, then this may be an adequate indication that formation water is being removed and sample may be collected. Rationale for samples collected when field parameters are outside of the target fluctuations will be documented on the sample collection logs.

Under low-flow sampling conditions, no minimum volume of water is required to be removed from a well prior to sampling. Under volume purge techniques (pump or bailer), at least 3 well volumes of water should be purged before sampling. Up to 5 well volumes may be purged if parameters do not stabilize after purging 3 volumes and there is an indication that the parameters may stabilize with further purging. However, if field measurements have not stabilized after 5 well volumes have been removed, then the site manager or technical lead shall be contacted to determine whether collecting a sample is appropriate under the observed conditions.

Turbidity measurements should be treated differently for different situations. When the analytical program specifies metals (total or unfiltered) for laboratory analysis, then the target turbidity shall be less than 10 nephalometric turbidity units (NTU), and consecutive turbidity readings less than 10 NTU will be considered equivalent. When metals are not an analytical parameter, then turbidity is not as great a concern, and the target shall be less than 20 NTU. However, in both cases, these goals may not be attainable due to soil types that make up the surrounding formation. If each parameter has stabilized, but turbidity is still above the target NTU value, then purging shall continue in an effort to attain the target NTU. Decisions to continue purging will be based on degree of deviation from the turbidity goal (e.g., a reading of 15 NTU versus 100 NTU), and will be made on a case-by-case basis by the AECOM project manager or technical lead, with agreement of the Corps of Engineers Project Manager or Technical Manager, if possible.

During purging, the field parameter values shall be periodically compared to the normal parameter ranges (Table 1). Parameters outside the normal range may indicate a problem with instrument calibration or a faulty well construction. The accuracy of certain instruments tends to drift with time and such instruments may require frequent calibration. An example of a faulty well construction is the presence of cement grout in the screen interval due to a poor bentonite seal. The cement grout causes the pH of the groundwater to be abnormally high (11-13 range). If the parameters are observed to be outside the normal range, the instruments shall be recalibrated and the measurement repeated. If the parameters are still outside the normal range for four consecutive readings during purging, the well construction may be faulty and the task manager or technical lead must be contacted for further direction. No samples shall be collected from a well with questionable construction until further direction.

5.8 Sample Collection

Regardless of the purging technique used, samples shall be collected at flow rates in the range 0.1-0.5 L/min or poured gently to avoid aeration, bubble formation, or turbulent filling of sample bottles.

Samples shall be collected in the following order of target analytes, if adequate amount of water is available in the well:

- Volatile organic compounds (Note: if one pump cycle does not provide enough water volume to completely fill all VOC vials, wait until the next pump cycle to obtain adequate volume to fill remaining vials. VOC vials should be filled and sealed immediately, and cannot be partially filled during one pump cycle, then wait for the next pump cycle to be completely filled.)
- Semivolatile organic compounds
- Turbidity

- Major water quality cations and anions
- Carbonate/bicarbonate
- Total suspended solids
- Total dissolved solids
- Kjeldahl nitrogen
- Total metals (Note: if sample turbidity level requires filtration of the total metals sample, collection of an unfiltered sample must also be performed.)
- Dissolved metals
- Total petroleum hydrocarbons
- Cyanide
- Ammonia, nitrogen

Samples for any target analytes not listed above shall be collected in the order of decreasing volatility within the framework of this list. If the amount of water available in the well is low, minimum volume requirements provided in Table 2 should be implemented or certain target analytes may be omitted, upon approval from the task manager and project chemist.

5.8.1 Filtered Samples

Filtered groundwater samples are normally not needed if a successful low-flow sampling program is implemented. However, if specified in the work plan, filtered groundwater samples will be collected according to the following procedures:

1. If using a flow cell,disconnect the tubing coming from the pump to the flow cell. Connect an inline, disposable filter to the pump discharge tubing and collect water discharging from the filter in the sample container. Do not collect a water sample from the flow cell discharge tube. If a flow cell is not being used, connect the filter to the discharge tube of the pump. Collect the water discharging from the filter in the sample container.
2. If the low rate is too slow to allow filtration through an in-line filter or if samples are collected by a bailer, an alternative filtration method may be required. A disposable filtration unit and a hand-operated vacuum pump will be used to filter the sample in the field.
3. If filtration cannot be accomplished in the field, an unpreserved sample (no nitric acid added) cooled to 4 degrees Celsius shall be shipped to the laboratory along with the preserved sample for unfiltered analysis. The unpreserved sample shall be filtered upon receipt and the filtrate preserved with nitric acid. The data from the laboratory filtered sample will be reported as “dissolved metals.”

5.9 Records

For each monitoring well purged, the technician shall complete a Monitoring Well Sample Collection Form (see Figure 1). This form prompts the technician to identify and record information such as: site ID, well ID, sample number, depth of well, depth to water, and well diameter. The technician can then use the information on the form to perform a well casing volume calculation. The form also includes spaces to record the field parameters that are measured during purging and any comments and observations. This form also prompts the technician to record the sample number, collection date, and time, sample containers, and associated quality control sample information.

Well purging and sampling information shall be recorded in the field log book for the site sampled. The field log will reference the field form containing the collected data associated with the sampling site. The daily field log entries shall be recorded chronologically and the time of the entry recorded first. Continuation pages shall be sequentially numbered and the last page recorded for the day shall be signed and dated by the recording technician.

6.0 Cross Reference

U.S. Army Corps of Engineers (USACE), 1994, Requirements for the Preparation of Sampling and Analysis Plans, EM 200-1-3, September.

U.S. Environmental Protection Agency (USEPA), 1986, Resource Conservation and Recovery Act (RCRA) Groundwater Monitoring Technical Enforcement Guidance Document, OSWER-9950.1, September.

USEPA, 1995, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, Groundwater Issue, EPA/540/S-95/504, December.

USEPA, 1996, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4, May.

USEPA, 2002, Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. Ground Water Forum Issue Paper. EPA 542-S-02-001. May 2002.

7.0 Tables

Table 1 - Water Quality Indicator Parameters

Table 2 - Water Sample Volume Requirements

8.0 Figures

Figure 1 - Monitoring Well Sample Collection Form

9.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	12 June 2013	Revision, AECOM
2	June 2014	Revision AECOM

Table 1
Water Quality Indicator Parameters

Measurement	Normal Range	Acceptable Variability
pH	4.6 to 8.5	± 0.1
Temperature (ºC)	10 to 18	± 10%
Specific Conductivity (µS/cm)	10 to 8,000	±3%
Oxidation Reduction Potential (mV)	+400 to -300	±10
Dissolved oxygen (mg/L)	<10	±10%
Turbidity (NTU)	variable	±10%

Abbreviations:

°C Degrees Celsius

µS/cm micro siemens per centimeter

mV millivolt

mg/L milligrams per liter

NTU nephelometric turbidity unit

Table 2

Water Sample Volume Requirements

Analysis	Standard Volume (mL)	Minimum Volume (mL)*	Minimum Volume Option*
Volatile organics	120	40	X
Semivolatile organics	1000	1000	
Explosives	1000	1000	
Perchlorate	125	125	
Pesticides/PCBs	1000	1000	
Herbicides	1000	1000	
Metals – Total	500	125	X
Metals – Dissolved	500	125	X
Mercury – Total Mercury – Dissolved	Included with metals (100)	Included with metals (100)	
Cyanide	500	125	X
Anions	250	100	X
Nitrate-nitrite	100	50	X
Total suspended solids and total dissolved solids (TSS and TDS)	500	200	X
Total organic carbon (TOC) RCRA 4/well	4 x 25	4 x 25	
Total organic halides (TOX) RCRA 4/well	4 x 100	4 x 100	
Total petroleum hydrocarbon (TPH)	1000	1000	X
Gasoline range organics (GRO)	80	40	X
Diesel range organics (DRO)	1000	1000	

Notes and Abbreviations:

* Quantitation limits (detection levels) may be affected when operating with minimum sample volumes. If volumes are lowered below the minimum sample volumes, quantitation limits will be raised.

mL milliliters

PCB polychlorinated biphenyls

RCRA Recourse Conservation and Recovery Act

Figure 1
Monitoring Well Sample Collection Form

AECOM

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	**Site:**			**LocID:**					**Date:**				
	Project: Longhorn Army Ammunition Plant			**Project No.**					**Recorded By:**		**Checked By:**		
EQUIPMENT	Water Quality Meter Type/ID #: Horiba U-52			Water Interface Probe:		Water Level Indicator:		ID#:	Min Recharge Level = (TD-DTW(0.80)) - TD				
	Unit #			Sampling Equipment:		Peristaltic/Bladder/Bailer		ID#:					
WELL INFO	Casing I.D. (in) [a]:			Static Water Level Reading (ft) [c]:					Weather Conditions:				
	Total Well Depth (ft) [d]:			Screened Interval/Pump placement:					Condition of Well/Remarks:				
CASING INFO	Casing I.D. (in) [a]:	**0.75**	1.5	**2.0**	2.2	3.0	**4.0**	4.3	5.0	6.0	7.0	8.0	
	Unit Casing Volume (gal/lin ft) [b]:	**0.023**	0.09	**0.16**	0.20	0.37	**0.65**	0.75	1.0	1.5	2.0	2.6	

Date	Time (24 hr)	Water Level (FTOC)	Pumping Rate (mL/min)	Temp. (°C)	pH	Cond (µS/cm)	DO (mg/L)	Turb. (NTU)	ORP (mv)	Remarks (odor, clarity, etc.)

Pump Rate: <=0.5 L/min **Drawdown:** <0.33 ft **Measurements:** 3-5 min **Stabilization:** +/-10% C, +/-0.1 pH, +/-3% Cond, +/-10% DO, +/-10%Turb(<=10 NTU ideal), for 4 consecutive readings

SAMPLE ID:	**TIME:**	**No. Containers/Volume/Type**	**Preserv.**	**Filter (Y/N)**	**Pump OR Bailer**	**Parameter(s)**
DUPLICATE (D): YES/NO						
MATRIX SPIKE (MS): YES/NO						
MATRIX DUPLICATE (MD): YES/NO						
CO= LEL= OXY= H2S=						

AECOM

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site:	LocID:
	Project:	Date:

Date	Time (24 hr)	Water Level (FTOC)	Pumping Rate (mL/min)	Temp. (°C)	pH	Cond (µS/cm)	DO (mg/L)	Turb. (NTU)	ORP (mv)	Remarks (odor, clarity, etc.)

Pump Rate: <=0.5 L/min Drawdown: <0.33 ft Measurements: 3-5 min Stabilization: +/-10% C, +/-0.1 pH, +/-3% Cond, +/-10% DO, +/-10%Turb(<=10 NTU ideal), for 4 consecutive readings

Standard Operating Procedure

Monitoring Well Development

Attachment 3

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Monitoring Well Development

Contents

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1.0 Purpose and Summary

This Standard Operating Procedure (SOP) is to define the procedural requirements for developing monitoring wells at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP. Deviations from the SOP will be captured in field documentation and noted in reports submitted to regulatory agencies.

Monitoring wells are developed to create an effective filter pack around the well screen by removing fine-grained particles, allowing freer flow of surrounding groundwater into the well. Properly developed filter packs provide samples that are most representative of formation water quality.

When a cement-bentonite grout is used to seal the annular space, wells shall not be developed for a minimum of 48 hours after grouting. Because timely development of a well is essential to remove fine-grained silt and clay particles that may become permanently lodged in the filter pack with time, well development activities shall be initiated within 7 days after the final grouting of the well.

Several well development methods are used within the industry. Most well development protocols use a combination of the following, as dictated by well construction and by the nature of the formation being monitored:

- Over-pumping
- Surging
- Bailing
- Airlifting
- Backwashing (prohibited at LHAAP)

The typical well development method to be employed for wells installed at LHAAP is a combination of surging and over-pumping methods. Water quality indicator parameters of the water produced during development will be monitored to assist in the proper development of monitoring wells. Indicator parameters include pH, specific conductance (SC), dissolved oxygen (DO), oxidation reduction potential (ORP), temperature, and turbidity.

Depending upon the amount of water in a monitoring well, well development may be accomplished during an initial attempt or, due to insufficient groundwater recharge, may need to be completed in multiple events over several days/months. As addressed in the following sections, wells with an inadequate amount of water to accomplish full development during the initial attempt must be redeveloped if the water level rises in the well during the next wet season. The site manager shall schedule water level measurements in the wet season in

wells that are candidates for redevelopment, so that a decision regarding a redevelopment effort may be made.

2.0 Health and Safety Considerations

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, are addressed in AECOM's site-specific Health and Safety Plan (HASP) for the project.

3.0 Responsibility Matrix

3.1 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.2 Field Team

All members of the field team (samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring that all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.3 Site Contractor Quality Control Systems Manager (CQCSM)

The Site CQCSM is responsible for ensuring that this SOP is correctly implemented and that the quantity and quality of well development activities meet the requirements of the project. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Bailer. A long, narrow tubular device with an open top and a check valve at the bottom that is used to remove water and sediment from a borehole or well. To be considered "close-fitting" a bailer must be sized no smaller than 1/4 - 1/2 inch smaller than the inner casing diameter.

Drilling Fluid. A water-based fluid used during drilling operations to remove cuttings from the borehole, to clean and cool the bit, to reduce friction between the drill string and the sides of the borehole, and/or to hold the borehole open during borehole advancement, retraction of downhole equipment and/or construction of the well.

Formation Damage. Reduction of formation hydraulic conductivity at the borehole wall caused by the drilling process. Formation damage may consist of compaction, clay smearing, clogging of pores with drilling mud filtrate, or other drilling-related impacts.

Monitoring Well. A well that is constructed by one of a variety of techniques that may serve a variety of purposes: (1) extracting ground water for physical, chemical, or biological testing; (2) measuring water levels; (3) measuring formation fluid chemical or physical parameters.

Surge Block. A plunger-like tool consisting of disks of flexible material (i.e., neoprene) sandwiched between rigid disks (i.e., metal) that may be solid or valved. The surge block is used force water to flush the well casing and surrounding sand pack during well development activities. The surge block should have a vent hole to let the air escape as the block is lowered.

Surging. A well development technique in which a surge block, close-fitting bailer, or close-fitting pump is alternately raised and lowered within the well casing, screen, or both, to create a strong inward and outward movement of water through the well screen and surrounding sand pack.

Turbidity. Measurement of the clarity of water due to suspended and/or colloidal material; measured in nephelometric turbidity units (NTU).

Water Quality Parameters. Chemical parameters used to determine when water produced from a well is representative of formation water. Water quality parameters typically include pH, SC, temperature, ORP, DO and turbidity.

Well Development. The act of removing fine-grained materials and/or drilling fluids from the well filter pack and formation materials so that natural hydraulic conditions are restored, turbidity is reduced, and well yields are enhanced.

5.0 Procedures, Equipment and Supplies

5.1 Required Records and Forms

1. Well Development Record (see Figure 1)
2. Field Log Book

5.2 Recommended Materials, Equipment, or Supplies

1. Personal protective equipment (PPE) as specified in the site-specific HASP
2. Water-level meter
3. Bailer
4. Surge block
5. Pump
    a. Bottom filling (bladder), peristaltic or centrifugal
        i. All pumps used should have check valves to prevent backflow.
    b. Pump control box
    c. Tubing appropriate for type of pump
    d. Teflon® coated stainless-steel wire

e. Power source (i.e., generator), if required

6. Flow-through cell to measure groundwater quality field parameters
7. Meter, to monitor groundwater quality parameters including temperature, SC, ORP, DO, turbidity, and/or pH
8. Decontamination supplies
9. Containment for generated liquid waste

5.3 General Requirement

Well development procedures will vary depending upon the amount of water available in the monitoring well. The well development procedures to be utilized based on the scenarios likely to be encountered are as follows:

Scenario 1. If the well screen is 80 to 100 percent submerged. Proceed with well development in accordance with procedures provided in Sections 5.4 and 5.5.

Scenario 2. If the height of the water column in the well is a minimum of 2 feet above the bottom of the screen, proceed with well development in accordance with procedures provided in Sections 5.4 and 5.5. Measure the water level in the well again during the wet season. Redevelop the well if the water level is significantly higher than the level at the time of the initial development. The task manager or the technical lead will evaluate the benefit of a redevelopment effort and instruct the field staff accordingly.

Scenario 3. If the height of the water column in the well is less than 2 feet above the bottom of the screen. The well shall not be surged. A minimum 2 feet of water is necessary for the surge operation to be effective. Sections 5.4 and 5.6 provide the procedures to be followed when less than 2 feet of water is present in the well. Measure the water level in the well again during the wet season. Redevelop the well if the water level is significantly higher than the level at the time of the initial development. The task manager or the technical lead will evaluate the benefit of redevelopment and instruct the field staff accordingly.

5.4 General Requirements for Developing Wells

The following steps shall be followed when developing wells:

1. Don PPE as specified in the site-specific HASP.
2. Calibrate all meters in accordance with SOPs and manufacturer's guidelines.
3. Open, check, and note the condition of the wellhead, including the location and condition of the surveyed reference mark.
4. Decontaminate and prepare the necessary equipment for developing the well.
5. Using a decontaminated electronic water level indicator, determine the static water level and depth to the bottom of the well (from the surveyed reference mark). Record measurements on the appropriate Well Development Record form (see Figure 1) and in the field log book. Compare measured total depth to reported total depth and document the accumulation of silt at the well bottom, if any.
6. Compare the depth to water with depths to the top and bottom of the screen. Determine which scenario from Section 5.3 is applicable based on the height of the water column in the well. Follow

the steps given in Section 5.5 if Scenarios 1 or 2 are applicable. For Scenario 3 (less than 2 feet of water column), follow procedures given in Section 5.6.

5.5 Specific Requirements for Well Development by Surge and Pump

The intent of this procedure is to effectively develop the well through mechanical surging and removal of settleable fines while minimizing overall volume of water removed from the well.

1. Slowly lower a submersible pump or peristaltic pump tubing into the well to a mid-screen depth (middle of water column if screened interval is not completely submerged) and commence pumping water to a flow-through cell. Measure and record initial water quality parameters (e.g., temperature, SC, pH, turbidity, ORP (Redox), and DO). Note: if a bailer is used to recover water for water quality parameter assessment, the DO readings obtained are unlikely to be valid.
2. Evacuate any sediment present at the well bottom using a bottom intake pump or bailer. If the well is shallow, a peristaltic pump may be used to evacuate sediments. Use the method anticipated to minimize the water volume removed while removing sediments.
3. Measure static water level after removing sediment. If screened interval was completely submerged prior to sediment removal but is not completely submerged after sediment removal, allow the water level to recover until screened interval is again completely submerged. If screened interval was only partially submerged prior to sediment removal, ensure the water level is allowed to recover to at least the previous level before continuing with development.
4. Insert the surge block or close-fitting bailer so that it is within the screen interval of the well. Surge the water column gently with 2 or 3 foot-long strokes working towards the bottom of the screen. All areas of the screened interval should be gently surged for 10-20 minutes. When surging is complete, remove the surge block and rods (or bailer) from the well slowly.
5. Slowly lower a submersible pump or peristaltic pump tubing into the well to a mid-screen depth (middle of water column if screened interval is not completely submerged) and commence pumping water to a flow-through cell. Measure and record initial water quality parameters (e.g., temperature, SC, pH, turbidity, ORP (Redox), and DO).
6. Repeat steps 1 through 5 until water quality parameters stabilize. The criteria for parameter stabilization are the normal ranges of values provided in Table 1. If the well dewaters before stabilization is achieved, allow the well to recharge and continue development until stabilization is achieved.
7. Following a minimum of 3 surge and pump cycles, a minimum of 3 well volumes should be removed. Depending on depth, static water level, and drilling methodology (mud rotary) additional well volumes may need to be removed.
8. Water quality parameters are considered stabilized if they are within the ranges provided in Table 1 for 3 consecutive measurements.
9. Periodically, compare the parameter readings with the normal range of values (Table 1). If the parameters are significantly outside the normal range, the field crew shall recalibrate the instruments and repeat the measurement. If the readings are consistently outside the range for 3 consecutive measurements, a faulty well construction may be the cause (e.g., grout in the filter pack). Contact the technical lead for further instructions.
10. Collect 0.5 liters of the last batch of water evacuated from the well and place it into a clean jar. The jar should be labeled with development date and well number. Each sample should be individually agitated and immediately photographed in a backlit setting so that the clarity of the water is visible. The photographs will be individually identified with the project name, well number, and photo date. The photograph will become a part of the well development documentation and will be included in the report along with the development log.
11. Record pertinent data in the Well Development Record (see Figure 1).

12. Remove the development equipment from the well, decontaminate (as required), and clean up the site. Lock the well cover before leaving. Dispose of produced water as required by the Project Work Plan.

5.6 Specific Requirements for Minimal Well Development

This procedure is applicable to situations where the height of the water level in the well is less than 2 feet above the bottom of the screen. Surging operations are not considered effective under these conditions and the development process essentially involves using a pump to evacuate sediments and extremely turbid water near the well bottom. The following steps should be followed to execute this procedure:

1. Using a bailer, remove a small quantity of water from the well. Empty contents into a container and measure water quality parameters. (DO readings will not be collected from bailed water, but only from a flow-through cell.)

2. Lower a bottom-filling pump into the well and evacuate the sediments and turbid water. If possible, maintain the pumping at a rate that would not cause the well to run dry. If the well goes dry, even at the lowest possible pumping rate, allow it to recharge and repeat pumping. A bailer may also be used for sediment evacuation.

3. Measure water quality parameters every 3 to 5 minutes during pumping, preferably using a flow-through cell if a pump is used.

4. Record pertinent data in a Well Development Record or equivalent form (see Figure 1).

5. Collect 0.5 liters of the last batch of water evacuated from the well and place it into a clean, clear glass jar. The jar should be labeled with development date and well number. Each sample should be individually agitated and immediately photographed in a backlit setting so that the clarity of the water is visible. The photographs will be individually identified with the project name, well number, and photo date. The photograph will become a part of the well development documentation and will be included in the report along with the development log.

6. Remove the development equipment from the well, decontaminate (as required), and clean up the site. Lock the well cover before leaving. Dispose of produced water as required by the Project Work Plan.

7. Water level shall be measured in the well during the following wet season. The well shall be redeveloped if the water level appears to have risen significantly. The task manager or technical lead will evaluate the benefit of redevelopment and instruct the field staff accordingly.

5.7 Well Volume Calculation

The well's volume must be calculated to estimate how many drums or other containers may be required to contain the purged water, and to determine how many well volumes were removed.

$$\text{Well Volume} = A + B$$

Where:

$$A \text{ (Riser Volume)} = (H \times r^2 \times \pi) \times 7.4805$$

B (Sand Pack Volume) =0.25 ((R^2 x π x L) – (r^2 x π x L)) x7.4805)

Where:

H = static water column (total depth – depth to water) (in feet)

r = radius of riser or screen (in feet)

R = Borehole radius (in feet)

π =3.146

L = Filter pack length (in feet)

7.4805 = gallons of water in a cubic foot

Porosity is assumed to be 25 percent. Record these data and calculations in the log book or Well Development Record (see Figure 1).

5.8 Development and Sampling Break

A period of at least 14 days will be allowed between well development and sampling. A period of 14 days will be allowed between well development and the installation of devoted monitoring well pumps or other in-situ equipment. The intent of this hiatus is to allow the newly installed and developed well to equilibrate to the ambient conditions, thus enabling the collection of a representative sample.

5.9 Restrictions/Limitations

Where flammable light non-aqueous phase liquid (LNAPL) or emulsified LNAPL is expected or known to exist on or in groundwater, use only intrinsically safe electrical devices during well development. Place portable power sources (e.g., generators) 50 feet or more from the wellhead and disposal drums. Effort should be made to remove LNAPL (bailer) prior to surging to prevent spreading/dispensing of product into sand pack/screen interval.

6.0 Exception Provisions

This SOP implements a modified surge-and-pump method that emphasizes the removal of sediments from the well in an efficient manner, and is not driven by the evacuation of a specified volume of water that may or may not remove all the sediments from the well.

7.0 References

American Society for Testing of Materials, 2005. Standard Guide for Development of Ground-Water Monitoring Wells in Granular Aquifers, ASTM D5521-05.

U. S. Army Corps of Engineers, Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic and Radioactive Waste Sites, EM 1110-1-4000, November 1998.

8.0 Tables

Table 1 – Water Quality Stabilization Parameters

9.0 Figures

Figure 1 – Well Development Record

10.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	28 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Table 1

Water Quality Indicator Parameters

Measurement	Normal Range	Acceptable Variability[1]
pH	4.6 to 8.5	± 0.2 pH units
Temperature (ºC)	10 to 18	±1 ºC
Specific Conductivity (µS/cm)	10 to 8,000	± 3%
ORP (mV)	400 to -300	± 10 mV
Dissolved oxygen (mg/L)	<10	±10%
Turbidity (NTU)	Variable	±10%[2]

Notes and Abbreviations:

[1]Acceptable Variability for 3 consecutive readings.

[2]Values of less than 10 NTU are considered to be equivalent.

°C - Degrees Celsius

µS/cm - Micro Siemens per centimeter

mV - Millivolt

mg/L - Milligrams per liter

NTU - Nephelometric turbidity unit

MONITORING WELL DEVELOPMENT FORM

LOCATION	Site:	LocID:	Date:
	Project Name: Longhorn Army Ammunition Plant	Project #:	Recorded By: Checked By:

EQUIPMENT	Water Quality Meter Type/ID #:	Water Level Indicator Type/ID #:
	Equipment Group:	Equpment Group:
	Development Equipment:	Equipment Decon.:

WELL INFO	Casing I.D. (in) [a]:	Unit Casing Volume (gal/lin ft) [b]:	Initial Depth to Water (ft) [c]:	
	Total Well Depth (ft) [d]:	Water Column Thickness (ft) [d-c]:	Well Volume (gal) {[d-c] x b}:	
	Ground Condition of Well:	Remarks:		

CASING INFO	Casing I.D. (in) [a]:	1.5	**2.0**	2.2	3.0	**4.0**	4.3	5.0	6.0	7.0	8.0
	Unit Casing Volume (gal/lin ft) [b]:	0.09	**0.16**	0.20	0.37	**0.65**	0.75	1.0	1.5	2.0	2.6

Date	Time (24 hr)	Method (pump, surge, bail)	Water Level (FTOC)	Volume Removed (gal)	Pumping Rate (gpm)	Temp. (C)	pH	Conduc-tivity (mS/cm)	DO (mg/L)	Turb. (NTU)	Sed. (mL/L)	Radiation ( )	Remarks (odor, clarity, etc.)

Development Criteria: **1)** sediment <0.75 mL/L, **2)** turbidity within 10 NTU range for 30 minutes, **3)** +/- 0.5 C, +/- 0.1 pH, +/- 3 % conductivity, +/- 10% DO for 3 consecutive readings, **AND**
4) remove water added during drilling and construction

MONITORING WELL DEVELOPMENT FORM

LOCATION	Site:	LocID:	
	Project Name: Longhorn Army Ammunition Plant	Project #:	

Date	Time (24 hr)	Method (pump, surge, bail)	Water Level (FTOC)	Volume Removed (gal)	Pumping Rate (gpm)	Temp. (C)	pH	Conduc-tivity (mS/cm)	DO (mg/L)	Turb. (NTU)	Sed. (mg/L)	Radiation ( )	Remarks (odor, clarity, etc.)

Development Criteria: 1) sediment <0.75 mL/L, 2) turbidity within 10 NTU range for 30 minutes, 3) +/- 0.5 C, +/- 0.1 pH, +/- 3 % conductivity, +/- 10% DO for 3 consecutive readings, **AND**
4) remove water added during drilling and construction

Standard Operating Procedure

Water Level Measurements

Attachment 4

Revision No.: 2

Revision Date: June 2014

Contents

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2.0 Health and safety considerations 2

3.0 Responsibility Matrix 2

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1.0 Scope and applicability

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines and procedures for use by field personnel in determining the groundwater level in monitoring wells at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

Proper recording procedures are necessary to assure the quality and integrity of all groundwater level measurements. Prior to collecting groundwater levels, a strategy should be developed based on the objectives of the investigation.

The measurement of the groundwater level in a well is frequently conducted in conjunction with groundwater sampling to determine the depth to water surface. This potentiometric surface measurement can be used to establish groundwater flow direction and gradients. Total well depth and groundwater level measurements are needed to determine the thickness of the water column and volume of water in the well casing prior to purging the well for sampling purposes.

All groundwater level and total well depth measurements should be made relative to an established reference point on the well casing and should be documented in the field records. To be useful for establishing groundwater gradient, the reference point should be tied in with the National Geodetic Vertical Datum or a local datum.

When measuring wells for water table or potentiometric surface analysis, and if the contaminant history is known for each of the wells, it is advisable to monitor water levels beginning with the least contaminated wells first and progressing to the most contaminated wells last, where practical.

The details within this SOP should be used in conjunction with the Work Plan which will generally provide the following information:

- Data collection objectives;
- Locations for data collections;
- Types of data to be collected; and
- Specific procedures required.

2.0 Health and safety considerations

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in AECOM's site-specific Health and Safety Plan (HASP) and Task Hazard Analysis (THA) document

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.3 Field Team

All field team members assigned to perform these activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Interferences

4.1 Potential interferences could result in inaccurate readings if the sensor on the water level meter is wet or dirty, or if the cable cannot be kept vertically upright (i.e., from a well that is not plumb or from a bridge in windy conditions). Care shall be taken to keep the probe clean, and to take appropriate measures to reduce these interferences when measuring water levels. The probe may also be shaken to remove water or other fluids that may adhere to the probe. If there is any concern that a particular reading may not be accurate, this shall be noted in the field log book.

4.2 If light non-aqueous phase liquid (LNAPL) is present in a well, the measured depth to water may not be representative of the hydraulic head/potentiometric level. If the LNAPL thickness and specific gravity are known, an accurate hydraulic head can be calculated.

4.3 Some water level meters (especially oil/water interface probes) may rely on optical technology for readings. In these cases, the readings may be influenced by the presence of light. While this is not an issue in wells, it may be at surface water bodies.

4.4 The measured depth to water is not always representative of the hydraulic head in the aquifer. Interferences may include barometric pressure effects, timing during tidal cycles, well construction details, confined/artesian aquifers, well efficiency, etc. Where such influences may be important, the project-specific work plan should specify any corrective measures or additional data to be collected. Interpretation and use of water level data should be performed by a trained specialist.

5.0 Procedures, Equipment and Supplies

5.1 Required Records and Forms

1. Field Log Book
2. Instrument operation manual

5.2 Recommended Materials, Equipment, or Supplies

1. Indelible black-ink pens and markers
2. Gloves, nitrile
3. Keys for (un)locking well caps
4. Paper towels
5. Radio, two-way, hand held or cellular phone
6. Safety glasses
7. Appropriate equipment and meters for obtaining field measurements as specified in the Work Plan (i.e., water quality)
8. Linear measuring device (e.g., tape measure)
9. Electronic water level indicator (appropriate length)
10. Organic vapor analyzer (e.g. flame ionization detector [FID]/photoionization detector [PID]).

The equipment must be capable of recording a measurement to the accuracy required by the Work Plan. Project data quality objectives and site characteristics must be taken into account when determining the groundwater level measurement equipment to use. The total number of wells to be measured, weather, tidal influences, pumping, and construction can all affect water level measurements.

5.3 General Requirements

Operation manuals provide operation and calibration procedures to be followed. Several standard steps should be taken before beginning any groundwater level measurement activity.

1. Verify that all personnel have read and understood the approved site-specific health and safety plan and have the proper training and certifications required under Occupational Safety and Health Administration.

2. Verify the site location by existing maps and surface features. Delineate the boundaries of the work site with flagging or other means to prohibit access to unauthorized personnel.
3. Check to see that all the necessary equipment (including personal protective equipment) is available at the site, is in good working condition, and has been properly decontaminated.
4. Check that all monitoring equipment is properly calibrated and operating. Measuring tapes should be checked a minimum of every six months against a surveyor's tape to determine if shrinking or stretching has occurred.
5. Visually inspect the well to ensure that it is undamaged, properly labeled and secured. Any damage or problems with the well head should be noted in the field log book and the site manager notified for repair or replacement of the equipment.
6. Uncap the well and monitor the air space for organic vapors immediately above the open casing with an FID/PID. Observe if any air is flowing into or out of the casing. In the event such conditions are observed, they should be noted on the field log book. If air is observed to be entering or flowing out of the casing, the sounder should not be placed inside the well until the air flow stops and pressure equalizes.

5.4 Specific Requirements

The specific procedure for determining groundwater level using an electronic water level indicator is described below.

1. Lower the electronic water level indicator into the well until the water surface is encountered as indicated by an audible (beep) or visual (light) signal.
2. When the water surface is reached, give the tape a short, sharp jerk to ensure that the probe is not responding to condensation along the well casing.
3. Measure the distance from the water surface to the permanent reference point. For aboveground "stickup" completions, the reference point is usually a groove cut into the north side of the casing. If no measurement point is marked on the casing, make a mark on the casing and measure the water level from that mark The point of measurement should then be noted in the field log book and the appropriate form on which the water level is recorded. For flush mount completions, such as in-ground well boxes, the groundwater level should similarly be measured from the well casing. Any well completions without permanent reference points or marks should be brought to the attention of the AECOM Technical Lead or Project Manager.
4. Record all appropriate information in the field log book or water level gauging form. At a minimum, the following information must be recorded:
    - Project name and number;
    - Unique well identification number;
    - Date and time of measurement collection;
    - Depth to water to the specified tolerance, and depth to any free product, as appropriate;
    - Weather conditions; and
    - Any problems encountered.

5. Once the water level measurement is completed, turn the device to the off position and slowly lower the probe to the bottom of the well. Record the depth to the bottom of the well to the nearest 0.01 feet and document the bottom condition (i.e., soft, hard).
6. Cap and relock the well.
7. Perform all equipment decontamination procedures as specified in the field procedures in Attachment 9 of Appendix D. Measuring equipment must be decontaminated prior to utilizing for well measurements.

5.5 Records

All information will be recorded on a field log book or water level gauging form for the subject site. Entries in the field log book will be recorded chronologically and the time of the entry recorded first. All continuation pages in the log book will be sequentially numbered and the last page recorded for the day will be signed and dated by the recording technician. Records generated as a result of this SOP will be controlled and maintained in the project record files.

6.0 Exception Provisions

None

7.0 References

Annual Book of ASTM Standards, 1987. Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well), D4750.

U.S. Army Corp of Engineers, 1998. Monitoring Well Design, Installation, and Documentation at Hazardous, Toxic, and Radioactive Waste Sites, EM 1110-1-4000.

U.S. Environmental Protection Agency (USEPA), 1986. RCRA Groundwater Monitoring Technical Enforcement Guidance Document, OSWER-9950.1, U.S. Government Printing Office, Washington, D.C.

USEPA, 1996. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4, Athens, GA.

8.0 Tables

None

9.0 Attachments

None

10.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Subsurface Soil Sampling by Split Spoon and Continuous Split Barrel Samplers

Attachment 5

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Subsurface Soil Sampling by Split Spoon and Continuous Split Barrel Samplers

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Standard Operating Procedure

Subsurface Soil Sampling by Split Spoon and Continuous Split Barrel Samplers

1.0 Scope and Applicability

This Standard Operating Procedure (SOP) describes the methods used in obtaining subsurface soil samples by split spoon for physical and/or chemical analysis at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. Subsurface soil samples are obtained in conjunction with soil boring programs and provide information as to the physical and/or chemical makeup of the subsurface environment.

Subsurface soil is defined as unconsolidated material which may consist of one or a mixture of the following materials: sand, gravel, silt, clay, peat (or other organic soils), and fill material. Subsurface soil sampling, conducted in accordance with this SOP will promote consistency in sampling and provide a basis for sample representativeness.

This SOP covers subsurface soil sampling by split spoon and continuous split barrel samplers , as these are the means most often used for obtaining samples of unconsolidated materials. Other types of equipment are available for use in subsurface soil sampling, including thin-wall tube samplers (Shelby tubes) and piston samplers. Information on the use of these other sampling devices may be found in several available drilling handbooks and respective state and/or federal agency technical guidance documents. The American Society for Testing and Materials (ASTM) also provides procedures for use of split spoon and other sampling devices.

Deviations from this SOP to accommodate other regulatory requirements should be reviewed in advance of the field program and must be documented in the field project notebook when they occur.

General Principles

1.1 Split spoon subsurface soil sampling generally requires use of a drilling rig and typically the hollow-stem auger or other common drilling method to generate a borehole in which to use the split spoon sampler. The split spoon sampler is inserted through the augers (or other type of drill casing) then is driven into the subsurface soil with a weighted hammer. The sampler is then retrieved and opened to reveal the recovered soil sample. Soil samples may be collected at a continuous interval or at pre-selected vertically spaced intervals within the borehole.

1.2 Continuous split barrel samplers requires the use of a hollow-stem auger. The continuous split barrel sampler fits within the lead auger of the hollow auger column. The sampler is locked in place and does not rotate as the augers are rotating. As the augers advance the soil enters the non-rotating sampling barrel. The sampler is then retrieved and opened to reveal the recovered soil sample. Soil samples may be collected at a continuous interval or at pre-selected vertically spaced intervals within the borehole with this sampling device.

2.0 Health and Safety Considerations

2.1 Subsurface soil sampling may involve chemical hazards associated with the types of contaminants potentially encountered and will always involve potential physical hazards associated with use of drilling equipment. When sampling is performed in materials which may contain hazardous constituents, or when the quality assurance objectives of the project require the use of hazardous solvents, adequate health and safety measures must be taken to protect sampling personnel. These measures must be addressed in the Site-Specific Health and Safety Plan (HASP). This plan must be approved by the project Health and Safety Officer before work commences, must be distributed to all personnel performing sampling, and must be adhered to as field activities are performed.

3.0 Responsibility Matrix

3.1 Field Team Leader

The Field Team Leader, is responsible for ensuring that field activities are are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.2 Field Team

All field team members assigned to perform these activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.3 Site Contractor Quality Control Systems manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of Work Plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Equipment and Materials

In addition to those materials provided by the subcontractor, it is recommended that the project geologist/sampling engineer have the following:

- Project-specific Work Plan, Quality Assurance Project Plan (QAPP), and HASP
- Boring logs
- Teaspoon, spatula, or putty knife (stainless steel is recommended)
- Sample kit (i.e., bottles, labels, custody records and tape, cooler)
- Folding rule or tape measure

- Equipment decontamination materials
- Health and safety equipment (as required by HASP)
- Field project notebook/pen

5.0 Procedures

5.1 General Method Description

5.1.1 Split spoon and continuous split barrel sampling devices are typically constructed of steel. The split spoon is most commonly available in lengths of 18 and 24 inches (1.5 to 3 inches in diameter), whereas the continuous split barrel sampler is typically 5 feet long (3.5 inches in diameter). Both sampling devices consist of a tubular body with two halves that split apart lengthwise, a drive head on the upper end with a ball-check valve for venting, and a hardened steel cutting shoe at the bottom. The soil sample enters the split spoon through the cutting shoe as the device is driven into the ground. Similarly the soil enters the continuous split barrel through the cutting shoe while the augers advance into the subsurface forcing the soil into the non-rotating sample barrel. A replaceable plastic or metal basket is often inserted into the shoe of these sampling devices to assist with retaining samples. Once the sampler is retrieved, the drive head and cutting shoes are removed and the split spoon halves are then separated, revealing the sample.

5.1.2 Sample depth intervals are usually defined on a project-specific basis with these requirements specified in the project-specific Work Plan. Sampling intervals typically range from 1 sample per 5 feet of drilling to continuous sampling where the entire drilled interval is sampled.

5.1.3 Subsurface soil sampling is usually accomplished as part of a drilling program where a soil boring is advanced with drilling equipment to the designated depth prior to collection of a representative sample. The general procedures outlined briefly in the following section provide requirements for advancing drill casing/augers in preparation for sampling.

5.2 General Procedures - Borehole Preparation

5.2.1 Advancing Casing/Augers

Soil borings that are completed for soil sampling purposes are typically advanced using hollow-stem augers and sometimes drive-and-wash or other casing methods. The casing/augers must be of sufficient diameter to allow for soil sampling. The casing/augers will be advanced to the required depth for sampling. If hollow-stem augers are used, a center rod with a drill bit is lowered into the hollow-stem augers and drilled to the targeted sampling depth. Upon reaching the sampling depth the center rod and drill bit is removed and the split spoon or continuous split barrel sampler is lowered into the hole and advanced into the soil as previously described.

5.2.2 Obstructions

For those borings which encounter obstructions, the casing/augers will be advanced past or through the obstruction if possible. Caution should be exercised when obstructions are encountered and an effort made to identify the obstruction before drilling is continued. If the

obstruction is not easily drilled through or removed, the boring should be relocated to an adjacent location.

5.2.3 Use of Added Water

The use of added or recirculated water during drilling is permitted when necessary. Use of extraneous water should be minimized or avoided if possible as it may impact sample quality. Water usage should be documented in the field notebook. Sampling and analysis of added or recirculated water may be required for quality assurance. If a well is installed within the completed borehole, removal of the added water may be required.

5.3 Sampling Procedure

5.3.1 Equipment Decontamination

Each split spoon and continuous split barrel sampler must be decontaminated prior to its initial use and following collection of each soil sample. Site-specific requirements for equipment decontamination should be conducted in accordance with Appendix D, Attachment 9, Decontamination of Field Equipment.

5.3.2 Standard Penetration Test

The drilling subcontractor will lower the split spoon into the borehole. Samples are generally obtained using the Standard Penetration Test in accordance with ASTM standards (ASTM D 1586-84). Following this method, the sampler will be driven using the 140 pound hammer with a vertical free drop of 30 inches using two turns of the rope on the cathead. The number of hammer blows required for every 6 inches of penetration will be recorded on the boring log. Blowcount information is used as an indicator of soil density for geotechnical as well as stratigraphic logging purposes. Once the split spoon has been driven to its fullest extent, or to refusal, it will be removed from the borehole. The continuous split barrel sampler can not be utilized for Standard Penetration Testing.

5.3.3 Sample Recovery

- The split spoon and continuous split barrel sampler will be immediately opened upon removal from the casing/auger. The open sampler shall then be screened for volatile organics with a photoionization device if required by the project-specific Work Plan. If the project-specific Work Plan also requires individual soil sample headspace screening for volatile organic compounds, then a small portion of the split spoon sample shall be removed and properly contained for that purpose.
- Sample recovery will be determined by the project geologist/sampling engineer who will examine the soil core once the sampler is opened. The length of sample shall then be measured with a folding rule or tape measure. Any portion of the sampler contents which are not considered part of the true sample (i.e., heaved soils) will be discarded. If the sample recovery is considered inadequate for sample characterization or analytical testing purposes, another sample should be collected from the next vertical interval if possible before drilling is reinitiated.
- Adequate sample recovery for stratigraphic logging purposes and/or headspace organic vapor testing purposes should be approximately 6 inches. Adequate sample recovery for analytical testing purposes should be a minimum of 12 inches and is somewhat dependent on the type of analytical testing required. In some cases, continuous

sampling over a short interval, and compositing of the sample, may be required to satisfy analytical testing requirements. Larger diameter samplers may be used if large volumes of soil are required for analytical testing.

5.3.4 Sample Containment - General

- Once retrieved, the sample will be removed from the sampler with a teaspoon, spatula, or putty knife and placed into the appropriate sample container. The sample will be split if necessary to meet sampling program requirements. Sample splitting may be necessary to provide individual samples for headspace testing, visual characterization, physical testing, analytical testing, or simply for archiving purposes. In general, most sampling programs are structured around environmental characterization needs; therefore, sample portions required for analytical testing should be collected first.
- Once filled, the sample containers should be properly capped, cleaned, and labeled, and chain-of-custody and sample preservation procedures initiated. Sampling equipment should then be properly decontaminated.

5.3.5 Sample Containment - Volatile Organic Analyses

Collection of subsurface soil samples for volatile organic analysis (VOA) is slightly more complex than collection of samples for other routine chemical or physical testing primarily because of the concern for the potential loss of volatiles during the sample collection procedure. To limit the potential for loss of volatiles, the soil sample needs to be obtained as quickly and as directly as possible from the sampler. This generally means that the VOA sample is to be collected and placed into the appropriate sample container first. The VOA sample should also be obtained from a discrete portion of the entire sample interval and not composited or homogenized. The remainder of the recovered sample can then be composited, homogenized or split to meet the other testing requirements. The boring log and/or sample logbook should be filled out to indicate actual sample collection depths for both VOA samples and other portions of the sample which may have been composited over a larger vertical interval.

6.0 Quality Assurance / Quality Control

6.1 Sampling personnel should follow specific quality assurance guidelines as outlined in the site-specific QAPP. Proper quality assurance requirements should be provided which will allow for collection of representative samples from representative sampling points. Quality assurance requirements outlined in the QAPP typically suggest the collection of a sufficient quantity of field duplicate, field blank, and other samples.

6.2 Quality control requirements are dependent on project-specific sampling objectives. The QAPP will provide requirements for sample preservation and holding times, sample container types, sample packaging and shipment, as well as requirements for the collection of various quality assurance samples such as trip blanks, field blanks, equipment blanks, and field duplicate samples.

7.0 Data and Records Management

7.1 Various forms are required to ensure that adequate documentation is made of sample collection activities. These forms include:

- Boring logs
- Field log books
- Sample collection records
- Chain-of-custody records
- Shipping labels

7.2 Borehole logs equivalent to that presented in Figure 1) will provide visual and descriptive information for each sample collected and are often the most critical form of documentation generated during a soil sampling program. The field log book is kept as a general log of activities. Chain-of-custody forms are transmitted with the samples to the laboratory for sample tracking purposes. Shipping labels are required if sample coolers are to be transported to the laboratory by a third party (courier service). Original copies of these records should be maintained in the appropriate project files.

8.0 References

ASTM D4700-91 (Reapproved 2006), Standard Guide for Soil Sampling from the Vadose Zone.

U.S. Environmental Protection Agency (USEPA), 1987, *Compendium of Superfund Field Operations Methods, EPA 540/P-87/001a, OSWER 9355.0-14*, September.

EPA, 1988, EPA *Guidelines for Conducting Remedial Investigation and Feasibility Studies under CERCLA, Interim Final OSWER Directive 9355.3-01*, August.

9.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

10.0 Tables

None.

11.0 Figures

Figure 1 - Borehole Log

Figure 1- Borehole Log

Borehole Log

AECOM

Site:	LocID:	Screened Aquifer:
Project Name:		Project Number:
Drilling Equipment:	Date/Time Started:	Total Depth (feet):
Drilling Contractor:	Date/Time Finished:	Depth to Water (feet):
Driller:	Completed:	Water Added (gal):
Drilling Method:	Borehole Diameter (in):	Ambient PID (ppm):
Drilling Fluid:	Logged By:	Checked By:

Depth (feet)	USCS Lithologic Description	USCS Type	Samples					Remarks (sample number, odor, etc.)
			PID (ppm) Headspace	OVA (ppm) Headspace	Recovered Length (feet)	Sample Number	Sample Time	
0								
5								

Standard Operating Procedure

Surface Soil Sampling

Attachment 6

Revision No.: 2

Revision Date: June 2014

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1.0 Scope and Applicability

This Standard Operating Procedure (SOP) establishes guidelines and procedures for use by field personnel in the collection and documentation of surface (0 to 1 foot depth) soil samples for physical and chemical analysis at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. Proper collection procedures are necessary to assure the quality and integrity of all surface soil samples. Documents other than those required by the contract and consulted in the preparation of this SOP are listed under "Cross References."

Surface soil samples are collected to determine the type(s) and level(s) of contamination and define the contaminated area(s). These samples may be collected as part of an investigative plan, confirmation sampling, and/or as a screen for "hot spots," which may require more extensive sampling.

Sediment(s) and sludge(s) that have been exposed by evaporation, stream rerouting, or any other means are collected by the same methods as those for surface soil(s). Typically for sediment and sludge, the top 1 to 2 centimeters of material, is carefully removed before collection of the sample. Based on analytical requirements, surface soil and exposed sediments or sludge are easily collected using stainless steel and/or Teflon™ lined trowels or augers, Terra Core™ Samplers or equivalent.

Surface soil samples for volatile organic compound (VOC) analysis may be collected using the Terra Core™ Samplers unless otherwise directed. Collection for volatile organic analysis (VOA) is slightly more complex than collection of samples for other routine chemical or physical testing, primarily because of the concern for the potential loss of volatiles during the sample collection procedure. To limit the potential for loss of volatiles, the soil sample needs to be obtained as quickly and directly as possible from the sampling equipment. This generally means that the VOA sample is to be collected and placed into the appropriate sample container first. The VOA sample should also be obtained from a discrete portion of the entire sample interval and not composited or homogenized.

Prior to conducting a soil sampling investigation, a sampling strategy should be developed based on the objectives of the investigation. The details within this SOP should be used in conjunction with the Work Plan, which will generally provide the following information:

- Locations and depths of soil samples to be collected;
- Numbers and volumes of soil samples to be collected;
- Types of analyses to be conducted for the samples; and
- Specific quality control (QC) procedures and sampling required.

2.0 Health and Safety Considerations

Surface soil sampling may involve chemical exposure hazards associated with the type of contaminants present in surface soil. When surface soil sampling is performed, adequate health and safety measures must be taken to protect sampling personnel. These measures must be addressed in the Site-Specific Health and Safety Plan. This plan must be approved by the project Health and Safety Officer before work commences, must be distributed to all personnel performing sampling, and must be adhered to as field activities are performed.

3.0 Responsibility Matrix

3.1 Field Team Leader

The Field Team Leader, is responsible for ensuring that field activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.2 Field Team

All field team members assigned to perform these activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.3 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of Work Plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Surface Soil – The soil which exists below the land surface approximately one foot.

Grab Sample – A discrete portion of soil taken from a specific location at a given point in time.

Terra Core™ Sampler – A disposable volumetric sampling device used for collecting small amounts (5 to 10 grams) of soil into laboratory-supplied containers.

Hand Auger – A stainless steel cylinder connected to an extendable stainless steel road with a T-shaped handle (for hand operation). The cylinder, approximately 3 to 4 inches in diameter and 1 foot in length, open at both ends with the bottom edge designed to twist into the soil. The cylinder collects the soil being excavated.

Trowel – A small stainless steel shovel approximately 6 to 8 inches in length with a slightly curved blade. The trowel has a stem-like handle (for hand operation). Samples are collected with a scooping action.

5.0 Procedures, Equipment and Supplies

5.1 Required Records and Forms

1. Sample Collection Log (SCL)
2. Field Log Book
3. Sample tags/labels and the appropriate forms/documentation for sample shipment
4. Project Specific Health Safety Plan
5. Site-Specific Work Plan and/or Field Sampling Plan (SFSP)
6. Manufacturer's instructions for Terra Core™ Sampling

5.2 Recommended Materials, Equipment, or Supplies

1. Indelible black-ink pens and markers
2. Appropriate sample containers
3. Insulated cooler
4. Packing tape
5. Latex gloves
6. Plastic zip-top bags
7. Decontamination equipment and supplies, including rinse bottles and deionized water
8. Personal protective clothing and gear
9. Stainless steel and/or Teflon™ -lined spatulas and pans, trays, or bowls
10. Stainless steel and/or Teflon™ -lined trowels and/or hand auger
11. Appropriate equipment for obtaining field measurements as specified in the applicable work plan or SFSP
12. Linear measuring device (e.g., tape measure)
13. Appropriate sampling containers
14. Terra Core® Sampler

5.3 General Requirements

The following steps shall be followed when preparing for sample collection:

1. Ensure that all surface soil sample locations have been appropriately cleared of all underground utilities and buried objects (see Attachment 14 Underground Utility Clearance of Appendix C). Review all forms and diagrams documenting the location of the cleared

sampling locations, as well as that of any underground utilities or lines, or other buried objects.

2. Don the appropriate personal protective clothing as dictated by the Site-Specific Health and Safety Plan.
3. Place clean plastic sheeting on a flat, level surface near the sampling area if possible, and place equipment to be used on the plastic. Place decontamination equipment and supplies and insulated cooler(s) on separate plastic sheeting. Cover all equipment and supplies with clean plastic sheeting when not in use.
4. Document the sampling events, recording the information on the SCL or equivalent form as specified. Document any and all deviations from this procedure in the field log book and include rationale for changes.

5.4 Specific Requirements for Collection of Surface Soil Samples Using the Terra Core™ Sampler

For sample collection activities that do not require the use of the **Terra Core™** Sampler, sample collection procedures documented in the Attachment 5 Subsurface Soil Sampling SOP and the Attachment 1 Collection and Field Screening of Soil Samples SOP will be followed. Sample analysis precedence is also presented in these SOPs.

Following the manufacturer's instructions samples for VOA should be collected in the following manner:

5.4.1 Collecting Sample

- Carefully remove any ground cover (i.e., stones, vegetation, etc.) from sampling location surface and the top 1 to 2 centimeters of exposed soil, sediment, or sludge before sample collection.
- Have the 40-ml glass VOA vial containing the appropriate preservative ready to receive a soil sample.
- Follow sampling pattern as described in the Work Plan.
- With the plunger seated in the center of the T-shaped sampler securely hold the sampler in your hand and push the coring portion of the sampler into the ground. The soil will fill the chamber within the coring portion of the sampler.
- Check to ensure that the chamber within the sampler is full. Once the chamber is full rotate the plunger in the center of the T-shaped sampler and push the plunger to extrude the sample into the laboratory-supplied container. Check with the laboratory to determine the amount of soil plugs required for each VOA vial.
- The sample coordinator will pack all samples going to the same laboratory in a cooler. Include properly-completed chain-of-custody forms, and affix custody seals to the three unhinged sides of the cooler lid (see Attachment 8 Packaging and Shipment of Environmental Samples of Appendix C).
- The TerraCore sampler is disposable and should not be reused. To minimize cross-contamination, decontaminate all other sampling equipment after sample collection at each sample location (see Attachment 9 Decontamination of Field Equipment of Appendix C).

5.4.2 The requirements for collecting samples of surface soil for non-volatile organic or inorganic analyses are as follows:

- Label each sample container with the appropriate information. Secure the label by covering it with a piece of clear tape.
- Use a decontaminated stainless steel or Teflon™ -lined trowel or auger as many times as necessary to obtain the volume needed to fill the specified sample containers.
- Empty the contents of each fill of the sampling device directly into a clean stainless steel or Teflon™ -lined tray or bowl.
- Homogenize the sample by thoroughly mixing together the total volume of sample using a decontaminated stainless steel or Teflon™ spoon, spatula, or trowel.
- Use the spoon, spatula, or trowel to distribute the uniform mixture into the labeled sample containers.
- Secure the appropriate cap on each container immediately after filling it.
- Wipe the sample containers clean with a clean Kimwipe™ or paper towel. Follow the proper sample handling, packaging, and shipping requirements as detailed in the field procedures sample handling section.
- Place sample containers in individual zip-top or similar plastic bags and seal the bags.
- The sample coordinator will pack all samples going to the same laboratory in a cooler. Include properly-completed chain-of-custody forms, and affix custody seals to the three unhinged sides of the cooler lid (see Attachment 8 Packaging and Shipment of Environmental Samples of Appendix C).
- To minimize cross-contamination, decontaminate sampling equipment after sample collection at each sample location (see Attachment 9 Decontamination of Field Equipment of Appendix C).

Surface soil samples are normally collected starting in the area believed to be least-contaminated, then moving to progressively more contaminated locations until the most-contaminated areas is sampled last.

5.5 Restrictions/Limitations

- The material obtained by the **Terra Core™ system** can be stored in the preserved VOA vials for up to 14 days.
- The **Terra Core™** Sampler is a disposable single-use device

5.6 Records

For each surface soil sample collected, the technician will complete a SCL. This form prompts the technician to identify and record information such as: site identification (ID), sample location ID, sample number, collection date and time, sample containers, and associated QC sample information. The field log book will record the general information regarding the surface soil sampling activities referencing the SCL for all the sampling data and information.

6.0 Exception Provisions

None.

7.0 Cross References

En Novative Technologies, Inc., Green Bay, Wisconsin, Disposable Terra Core™ Sampler Sampling Procedures.

Hazardous Waste Remedial Actions Program, 1996. Document No. DOE/HWP-100, Standard Operating Procedure 5A, Sampling of Surface Soils and Other Surficial Materials.

U.S. Environmental Protection Agency, 1996, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4, Athens, GA.

8.0 Tables

None

9.0 Attachments

None

10.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Surface Water Sampling

Attachment 7

Revision No.: 2

Revision Date: June 2014

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1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to define requirements and methodologies for collecting surface water samples at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation.

The sampler should refer to the Work Plan when appropriate for project specific requirements and objectives. Documents other than those required by contract and used in the preparation of this SOP are listed in the "Cross Reference" section.

Surface water sampling techniques and equipment are designed to minimize effects on the physical and chemical integrity of the sample.

Because data quality objectives, contaminant types, and surface water body configurations vary from site to site, a variety of sampling equipment and techniques will be necessary. The procedures described herein define the methods and equipment required to collect surface water samples in a variety of environments.

2.0 Health and Safety Considerations

2.1 This section presents the generic hazards associated with surface water sampling and is intended to provide general guidance in preparing site-specific health and safety documents. The site-specific Health and Safety Plan will address additional requirements and will take precedence over this document. Note that surface water sampling usually requires Level D personal protection unless there is a potential for exposure to airborne site contaminants.

2.2 Health and safety hazards include but are not limited to the following:

- Slip, trips, and falls in tall grasses over obstacles, and muddy conditions or side slopes near stream banks. Review terrain hazards prior to conducting these operations. Ensure there is a safe means of access/egress to the sampling location.
- Dermal exposure to potentially contaminated water. Ensure that proper personal protective equipment is used to mitigate the impact of splashes of water to skin and/or eyes.
- Use appropriate ergonomic techniques when inserting or retrieving equipment from the lake or stream to preclude injury to the arms, shoulders or back.

3.0 Responsibility Matrix

3.1 Field Team Leader

The Field Team Leader is responsible for ensuring that all activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.2 Field Team

All field team members assigned to perform surface water sampling activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Technical Lead or Project Manager.

3.3 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of Work Plans and SOPs, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Surface water: Water that flows over or rests on the land surface, exposed to the atmosphere; it includes streams, rivers, lakes, pools, ponds, etc.

Grab sample: Discrete aliquot representing a specific location at a given point in time. All of the sample volume is collected at one time, at only one particular point in the sample medium. Grab samples are not mixed or composited with other samples.

Composite sample: Nondiscrete samples composed of more than one specific aliquot, collected at various locations or at different points in time. Analytical results from this type sample represent an average value for the locations or time periods incorporated into the sample. Composite samples can be collected where investigative goals indicate that it is appropriate; otherwise, grab samples should be collected.

5.0 Equipment and Supplies

5.1 Required Records and Forms

1. Field Log Book
2. Sample collection log (SCL)
3. Sample tags/label and the appropriate forms/documentation for sample shipment
4. Material safety data sheets

5.2 Recommended Materials, Equipment, and Supplies

The list of potential sampling equipment and supplies needed for collection of surface water samples includes but is not limited to the items listed below. The specific requirements for each sampling project should be identified from the results of the pre-sampling field reconnaissance.

1. Life preservers
2. Polyethylene safety line (floatable)
3. Cellular phone or radio
4. Site maps
5. Pond sampler or extended dipper with 1-liter beaker, clamp, and telescoping heavy duty pole, sample collection vessels- bucket, bailer, beakers- composed of Teflon, glass, stainless steel, or other inert material
6. Sample bottles with preservative (if required)
7. Sample coolers with ice or blue ice
8. Sample collection logs
9. Folding ruler or yardstick
10. 100-foot measuring tape
11. Stopwatch
12. Camera
13. Flagging tape
14. Boat or canoe
15. Waders
16. Mudders
17. Wooden stakes
18. Horiba Water Quality Meter or equivalent
19. Peristaltic pump

6.0 Procedures

6.1 General Considerations

Regardless of the sampling methods or equipment selected, several general procedures are applicable to the collection of all surface water samples.

1. If surface water is extremely silty or muddy, sampling should be postponed until better conditions prevail.

2. Collect samples first from those areas suspected of being the least contaminated and collect samples from areas suspected of being contaminated last, thus minimizing the risk of cross-contamination.
3. If sediment samples are to be collected at the same location as surface water samples, the surface water samples must be collected first. In general, surface water samples should be collected from the section of the water column indicated by the specific gravity of the analytes being sampled for. The exception would be when sampling to assess a floating layer or sheen.
4. The flow rate in a flowing water body should be measured or estimated. See Attachment 18 Water Depth and Velocity Measurements for procedures.
5. When sampling in flowing water, the sample locations will depend upon the flow conditions and channel geometry relative to location of the suspected release. Stagnant pools should be avoided unless they are adjacent to a suspected discharge point. Samples are to be collected from the mobile portion within the stream. If the channel is linear, the sample should be collected from the same side of the stream as the source or suspected discharge point. When sampling for volatile organic compounds (VOCs), avoid sampling below waterfalls or riffles or in shallow water in direct sunlight, where volatility effects could impact sample integrity.
6. Where possible, take field measurements (e.g., pH, temperature, conductivity, etc.) directly from the surface water body (not the sample) in the location from which the sample was collected.
7. Whenever possible, surface water samples should be collected directly into the sample container. Samples for oil and grease, total petroleum hydrocarbons (TPH), etc., must be collected directly into the sample container. This procedure reduces any loss of volatiles, cross-contamination, or other alteration that could occur during transfer from a collection vessel into the sample container.
8. Samples collected for analysis of VOCs and some semivolatile organic compounds (SVOCs) must not be composited.
9. For any given stream, sampling should begin with the sampling point located farthest downstream and proceed upstream to prevent cross-contamination of downstream samples by upstream activities. For lakes and ponds, sampling should begin with the sampling point located closest to the discharge point and proceed around the lake or pond in an orderly fashion.
10. If wading is required, one should approach the sample site from downstream, being careful not to disturb any bottom sediment. The mouth of the sample container should be positioned so it faces upstream while the sampling personnel are standing downstream. In water bodies with little or no current, the sampling personnel should not enter the actual sample area. A pond sampler with an extendable handle should be used to reach the sample site.
11. Unless required otherwise, samples should be collected from below the water surface. The sample container should be submerged and then opened underwater to expel air.

12. Sample packaging, handling, and shipping shall be conducted in accordance with Sampling Handling Procedures in Attachment 8.
13. The collection of surface water samples should be documented in the appropriate Field Log Book and/or a sample collection form.

6.2 Preparation

The following steps should be taken when preparing for sampling surface water.

1. Conduct a presampling field reconnaissance to verify the presence of surface water and to assess field conditions. The field reconnaissance will assist in the selection of appropriate equipment for health and safety and sampling requirements. The sampling locations should be assessed to 1) verify the surface water body is not excessively silty or muddy, and 2) for flowing water bodies, to verify that baseflow conditions prevail.
2. Calibrate field equipment and instruments as required and ensure they are in proper working order.
3. Record on the Field Log Book a description of the site and sampling location. Include description of the water body (size, depth, flow, bottom materials).
4. Put on required protective clothing and gear as specified in the Health and Safety Plan.
5. Prepare sampling site by laying out plastic sheeting on the ground and on any tables used. Segregate sampling equipment and supplies from the decontamination area.
6. Sampling equipment must be decontaminated prior to, between, and after sample locations in accordance with decontamination procedures described in AECOM's SOP #9.

6.2.1 Shallow Surface Water Sample Collection for Volatile Organic Compounds

The following steps must be taken when collecting samples of near-shore surface water for volatile organic analysis (VOA).

1. Collect the sample in either a stainless steel or Teflon collection container/device. Do not disturb bottom sediments. The container should be inverted upon placement in the water so that only water from the desired sample point enters when turning the container upright, expelling air. (If this procedure is not followed, the sample container will be filled with the water that first enters the container as it enters the water, not water from the targeted sampling depth). Place the mouth of the collection container at the desired sampling depth and turn the container upright to expel air and collection sample. Ensure the open end of the container is pointed upstream in undisturbed, gently flowing water.
2. Immediately upon collection, decant water from collection container/device into 40 ml a glass VOA vial, either with or without preservative. When transferring water, be sure the collection container does not come in contact with the VOA vial.
3. Ensure a meniscus is raised above the lip of the vial before capping. Be sure to dislodge any air bubbles from the vial before sealing with the cap.
4. Place cap with Teflon septum on each vial as it is filled.

5. Turn the vial upside down and check for air bubbles. Tap the bottom of the vial to dislodge any bubbles that may have formed around the cap or sides. If bubbles are present, remove the cap and add sample water to fill the vial.
6. Repeat steps 3 through 5 until a VOA vial without air bubbles is obtained.
7. Wipe dry the sample vials and label.
8. Place sample container(s) in zip-top or other plastic bags and immediately place into a sample cooler with ice and cool to 4 ± 2 ° Celsius (°C).

6.2.2 Shallow Surface Water Sample Collection for Nonvolatile Organic and Inorganic Compounds

The following steps must be followed when collecting shallow, surface water samples for nonvolatile organic and inorganic compounds.

1. Use the appropriate flask, dipper, pail, or pond sampler (if required) to collect samples.
2. Immerse sample container into the water and fill. Do not disturb underlying sediments.
3. When collecting grab samples, the sample containers should be filled directly underwater.
4. If the Work Plan requires the collection of composite samples, collect a sufficient volume of water to fill all sample containers and place pooled samples into a stainless steel or glass mixing bowl. Homogenize the sample by stirring and pour into the appropriate sample containers.
5. Seal sample containers, wipe dry, and label.
6. Place sample container(s) in zip-top plastic bags and immediately place into a sample cooler with ice and cool to 4 ± 2 °C.

6.3 Collection of Samples for Oil and Grease, Total Petroleum Hydrocarbons, etc.

Samples collected for oil and grease, TPH, etc., must be collected directly into the sample containers from the water surface. Never composite samples collected for oil and grease, TPH, etc.

6.4 Deep Surface Water Sample Collection

Numerous methods and devices have been used to collect discrete, at-depth samples from surface waters. The most practical methods incorporate the use of either a weighted bottle, Wheaton bottle, Kemmerer bottle, or a peristaltic pump.

The weighted bottle and the Wheaton bottle are very similar. The weighted bottle and Wheaton bottle devices are lowered to the desired depth, at which time a mechanism is activated to open the sampler. When the sampler is full, the device is raised to the surface and the contents are transferred to the appropriate sample containers. The Kemmerer bottle is a messenger-activated water-sampling device. In the open position, water flows through the device. Once lowered to the desired depth, a weighted messenger is dropped down the sample line, thus tripping the release mechanism and closing the bottle. In the closed position the bottle is sealed, allowing retrieval of the sample. The peristaltic pump sampling system can be used to obtain surface water samples at depths up to approximately 26 feet (ft). The peristaltic pump is suitable for most physical, chemical, or radiological

parameters. If the flow rate of the pump is reduced to minimize sample agitation, this method may permit VOC sampling for definitive confirmation (if permitted by the appropriate regulatory agencies).

Note: All sampling equipment should be constructed of material that will not compromise the integrity of the sample (e.g., Teflon, stainless steel, or glass).

6.4.1 Method for Specified Depth Collection of Surface Water Samples Using a Weighted Bottle Sampler

The basic operation of the weighted bottle sampler, the Wheaton bottle, and the Kemmerer bottle are similar; therefore, to avoid repetition, only the procedure for use of the weighted bottle is detailed here. The following steps must be followed when collecting (specified depth) surface water samples using a weighted bottle sampler. For VOC samples, the bottle must be constructed of stainless steel or Teflon material.

1. Lower the weighted sampler to the specified depth.
2. Remove the stopper by pulling on the sampler line; allowing the sampler to fill with water.
3. Release the sampler line to reseat the stopper. Retrieve the sampler.
4. Fill the appropriate sample containers. Samples may be composited in stainless steel or Teflon containers if required.
5. Seal each container once it is filled. Follow procedures in section 6.1.3 to properly fill the VOA vial.
6. Wipe dry the sample containers and label.
7. Place sample container(s) in zip-top plastic bags and immediately place in a sample cooler with ice and cool to 4 ± 2 °C.

6.4.2 Method for Deep Surface Water Sample collection by Peristaltic Pump

The following steps must be followed when collecting deep, surface water samples by peristaltic pump.

1. Install clean, medical-grade silicon or Tygon tubing on the pump head. Leave sufficient tubing on the discharge side for convenient dispensing of liquid directly into sample containers.
2. Select the appropriate length of Teflon intake tubing necessary to reach the specified sampling depth. Attach the intake sampling tube to the intake pump tube.
3. Lower the intake tube to the specified depth. Tubing may need to be weighted to reach specified sampling depth.
4. Start the pump and allow at least three tube volumes of water to flow through. Collect the purged water and then return it to the source after sample collection is complete.
5. Fill the appropriate sample containers directly from the discharge line. Allow the liquid to flow gently down the side of the sample bottle to minimize entry turbulence.
6. For VOC samples, care must be taken to exclude water from the sample that has contacted the silastic pump head tubing. Collect the sample from the inlet end of the tubing by stopping the pump, retrieving the inlet end of the tubing, and reversing the

pump flow to fill the VOA vial from the inlet end of the tubing. Follow procedures from section 6.1.3 to properly fill the VOA vial.

7. Cap and seal sample containers. Wipe dry the sample containers and label.
8. Place sample container(s) in zip-top plastic bags and immediately place in a sample cooler with ice and cool to 4° ± 2°C.
9. Drain the tubing and dispose of it. Obtain new tubing for the next sample.

6.4.3 Method for Deep Surface Water Sample Collection by Syringe Sampler (VOC Only)

1. Install clean, medical-grade silicon tubing on a sterile medical catheter syringe (60 milliliter [ml]). Leave sufficient tubing on to allow for sample collection depth with respect to the sample collection personnel location (i.e., if a sample is being collected at the bottom of a sink hole that is 6 ft in depth and the sides of the sink hole are 4 ft from the center, then you will need approximately 11 ft of silicon tubing). A pole and cable ties will be needed to attach the syringe sampler in order to collect the sample at the desired location.
2. Attach a disposable polyethylene tubing connector to the silicon tubing. Attach a 3 foot section of clean disposable Teflon tubing. The volume of the tubing will be approximately 90 ml. Attach the other disposable polyethylene tubing connector to the end of the Teflon tubing in order to retain the sample volume.
3. Lower the syringe sampler intake tube to the specified depth.
4. Draw a vacuum by pulling back the syringe plunger. Retrieve the Teflon tubing and fill the appropriate VOC sample containers with water from the Teflon tubing. Allow the water to flow gently down the side of the sample bottle to minimize entry turbulence. Slowly push in the plunger which will slowly fill the VOA bottle from the end of the tubing. Follow procedures in section 6.1.3 to properly fill the VOA vial.
5. Return any excess volume to the surface water body after the sample collection is complete.
6. Cap and seal sample containers. Wipe dry the sample containers and label.
7. Place sample container(s) in zip-lock bags and immediately place in a sample cooler with ice and cool to 4 ± 2 °C.

6.5 Surface Water Sample Compositing

Surface water samples can be composited on a spatial or temporal basis.

6.5.1 Surface Water Spatial Compositing

The following steps are to be followed when collecting spatially composited surface water samples.

1. Determine where composite sample(s) will be obtained as detailed in the Work Plan. Note: VOC and, in some cases, SVOC samples must be collected and contained immediately as discrete samples and, therefore, cannot be composited.

2. Collect a minimum of three equal-volume samples from the specified sample location. The volume of each sample must be at least the amount required for a single sample.
3. Place the samples in a stainless steel bowl and homogenize the pooled samples with a stainless steel spoon or dipper.
4. Transfer aliquots of the composited sample into the appropriate sample containers. Seal, rinse, label sample containers, and immediately place in a cooler with ice and cool to 4 ± 2 °C.

6.5.2 Time Averaged Compositing

Time averaged composite sampling is used to determine mass-per-unit time concentrations and to identify sporadically discharged contaminants from outfalls or streams. The system can be used for basins, ponds, pools, lakes, or streams. Time averaged composite samples can be collected with an automated sampler (i.e., ISCO sampler) or manually. Factor influencing the selection of the time averaged sampling method (automated sampler or manual sample collection) include, but are not limited to considerations such as sampling frequency, location accessibility, security, and budget constraints.

The following steps are to be followed when collecting time-averaged composite surface water samples with an automated sampler:

1. Place the automated sampler with the refrigerated sample-collection jar near the specified sample point. Appropriate cleanliness applies here as it does for other surface water sample collection.

   Set mechanisms on the sampler to collect a selected volume at the desired time frequency (e.g., 250 ml of the total discharge at the same time each hour). At the end of the period of sampling specified in the Work Plan, decant the samples, (including VOCs) into the appropriate sample containers. Seal, rinse, label sample containers, and place in a cooler with ice and cool to 4 ± 2 °C. Handle with the same care as other samples from the site. For each surface water sample collected, the technician will complete a SCL. This form prompts the technician to identify and record information such as: site ID, sample location ID, sample number, collection date and time, sample containers, and associated QC sample information. Other pertinent information to be recorded includes an estimate of flow rate (if applicable), diagram of sampling site, channel configuration, and height of water column. All sampling data and information will be recorded on the SCL. General information concerning the sampling activities will be recorded in the Field Log Book. The Field Log Book entries will be recorded chronologically and the time of the entry recorded first. All Field Log Book continuation pages will be sequentially numbered and the last page recorded for the day will be signed and dated by the recording technician.

   Records generated as a result of this SOP will be controlled and maintained in the project record files.

6.6 Marking of Surface Water Sample Locations

Coordinates of sampling locations will be determined by GPS so subsequent sampling can be performed at the same locations. GPS coordinates of the sampling locations will be noted in the Field Log Book or sample collection form.

7.0 Data and Records Management

There are several documents that must be completed and maintained as part of the Surface Water Sampling procedure. The documents will provide a summary of the sample collection procedures and conditions, shipment method, the analyses requested, and the custody history. The documents may include:

- Field log book
- Surface Water Sampling forms
- Sample labels
- Chain of custody
- Shipping receipts
- Health and Safety forms

The field record should be of sufficient detail to allow others to understand how and where samples were taken. All documentation will be retained in the appropriate project files.

8.0 References

Department of Energy, Environmental Survey Manual, DOE/EH-0053, 19*. Lockheed Martin Energy Systems, Inc., Quality Control Requirements for Field Methods, DOE/HWP-69/R2. , Hazardous Waste Remedial Actions Program, Oak Ridge, Tennessee,* 1996.

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U.S. Environmental Protection Agency*, A Compendium of Superfund Field Operations Methods, EPA/540K/P-87/001,* 1987.

U.S. Environmental Protection Agency*, Data Quality Objectives Process for Superfund, EPA/540/G-93/071, 1993. U.S. Environmental Protection Agency, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual,* 1996*.*

U.S. Environmental Protection Agency*, Practical Guide for Groundwater Sampling, EPA/600/2-85/104,* 1985.

9.0 Tables

None

10.0 Attachments

None

11.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Packaging and Shipment of Environmental Samples

Attachment 8

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Packaging and Shipment of Environmental Samples

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Standard Operating Procedure

Packaging and Shipment of Environmental Samples

1.0 Scope and Applicability

1.1 Purpose and Applicability

This Standard Operating Procedure (SOP) establishes guidelines and procedures for field personnel to use in the packaging and shipping of environmental samples for chemical and physical analysis at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

This SOP only applies to the packaging and shipping of low concentration environmental samples. This procedure does not apply to those samples considered hazardous materials, hazardous waste, mixed waste, radioactive waste, or dangerous goods. Those requirements are specified in the Department of Transportation (DOT) 49 CFR 171-178 and the most current edition of the International Air Transport Association (IATA) Dangerous Goods Regulations. The details within this SOP are only applicable to the general requirements for sample packaging and shipping and should only be used as a guide for developing more job-specific work plans. The details within this SOP should be used in conjunction with the Work Plan, which will generally provide the following information:

- Sample collection objectives
- Locations and depths of soil samples to be collected
- Numbers and volumes of soil samples to be collected
- Types of analyses to be conducted for the samples
- Specific quality control procedures and sampling required

2.0 Health and Safety Considerations

2.1 Shipment of Samples

Sampling personnel should be aware that packaging and shipment of samples involves potential physical hazards primarily associated with handling of occasional broken sample containers and lifting of heavy objects. Adequate health and safety measures must be taken to protect sampling personnel from these potential hazards. The project Health and Safety Plan (HASP) generally addresses physical and other potential hazards. This plan must be approved by the project Health and Safety Officer before work commences, must be distributed to all personnel performing sampling, and must be adhered to as field activities are performed.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Environmental Sample - A low concentration sample that does not meet DOT or IATA definitions for a regulated shipment.

Hazardous Materials/Dangerous Goods Sample - Medium or high concentration sample regulated by either DOT or IATA.

Hazardous Waste - Any substance listed in 40 CFR Subpart D (260.30 et seq.) or otherwise characterized as ignitable, corrosive, reactive, or toxic as specified in Subpart C (261.20 et seq.) that would be subject to manifest and packaging requirements specified in 40 CFR 262. Hazardous waste is defined and regulated by the U.S. Environmental Protection Agency.

Hazardous Material/Dangerous Good - A material in a quantity or form which may pose an unreasonable risk to health, safety, and/or property as defined by DOT when transported in commerce. Hazardous materials are defined by DOT (49 CFR 171.8), and dangerous goods are defined by IATA (Section 3).

Sample - Physical evidence collected from a facility or the environment which is representative of conditions at the point and time at which the sample is collected.

U. S. DOT Regulations - Requirements for shipping hazardous materials by highway domestically found at 49 CFR 171-178.

IATA Regulations - Requirements for shipping dangerous goods by air both domestically and internationally.

5.0 Procedures, Equipment and Supplies

5.1 Supplies and Equipment

The following is a list of the supplies and equipment needed to implement this SOP in the field.

5.1.1 Required Records and Forms

1. Sample Collection Log
2. Field Log Book
3. Sample tags/labels and the appropriate forms/documentation for sample shipment
4. Material Safety Data Sheets (MSDS)
5. Quality Assurance Project Plan
6. CFR 171-178 for ground shipping or the IATA regulations for air shipping.

5.1.2 Recommended Materials, Equipment, or Supplies

1. Indelible black - ink pens and markers
2. Plastic or metal coolers (typically provided by the laboratory)
3. Waterproof sealing tape
4. Ice (double bagged)
5. Fiberglass packing tape
6. Nitrile or Latex gloves
7. Plastic Zip-Loc ® bags
8. Bubble wrap, styrofoam packing material, vermiculite (or other absorbent)
9. Shipping Forms and Chains of Custody Forms

5.2 Procedures

The following steps must be followed when packaging and shipping non-regulated environmental samples:

1. Properly label (with indelible ink) sample container with the site, unique sample identifier, matrix type, time and date of collection, analytical method, preservatives, and sampling personnel at the time of sample collection. Clear tape should be placed over the label to minimize damage to sample label caused by moisture.

2. As soon as possible after sample collection, tightly seal the container, and place a piece of custody tape over or around the cap. The custody tape should be placed over the cap so that any attempt to remove the cap will cause the tape to be broken. Do not place custody tape over a volatile organic analysis vial septum.
3. Prepare chain-of-custody (COC) and request for analyses forms as required by the Quality Control Plan.
4. Place all containers in separate, appropriately sized, airtight, seam sealing polyethylene bags (e.g., Ziploc ®). Seal the bag, removing any excess air and wrap with bubble wrap or similar material.
5. Place the bagged container inside an insulating shipping container, such as a common plastic picnic cooler (not styrofoam).
6. Surround the bagged container with absorbent material (e.g., vermiculite), if desired for sample type.
7. Samples must be packed so they are surrounded and covered by a sufficient volume of ice to maintain a 4 ± 2 degrees Celsius (°C) temperature immediately following collection of the samples in the field and during the entire shipping period. Ice used in the cooler must be contained in two sealed, leak-proof plastic bags to prevent contact of the sample containers with melted ice.
8. Sample labels must be compared to the COC forms to ensure proper documentation. Sample labels must be attached so they will not come loose from sample containers during shipment or if they become wet (the use of clear tape wrapped around the label will prevent this).
9. Place additional packing material (e.g., bubble wrap, vermiculite, or styrofoam) on top of the samples to eliminate the potential for samples to shift during shipment. Cushioning materials may be used to inhibit breakage of sample containers; however, cushioning material must not interfere with maintaining sample cooling.
10. Record the air bill number or other shipping information on the COC.
11. Place the original COC in a resealable bag and tape to inside of top of cooler. A copy of the COC must be retained for the field file.
12. Place custody seals on shipping container. Use custody seals on individual bottles if coolers might be opened during transport (e.g., customs, etc.).
13. Seal cooler with strapping tape over the custody seals. Place address label on cooler. Mark the container "THIS END UP," or apply arrow labels that indicate the proper position to be maintained during shipping.
14. If samples are shipped via commercial overnight delivery service, a copy of the shipping bill must be retained in the appropriate files. All pertinent information must also be recorded in the Field Log Book. If sampling personnel are delivering samples to the laboratory, this should be noted on the COC. In this case, the cooler need not have custody seals during transport.
15. The laboratory should be contacted to confirm safe arrival of all samples. If delivery of samples will occur at the laboratory on weekends or holidays, the laboratory will be

notified to have someone available to receive them. Any problems occurring after sample shipment should be recorded in the Field Log Book along with the names of personnel at the laboratory who explained the problem.

6.0 Exception Provisions

1. Blue ice or similar products are not allowed for shipping or while in the field collecting samples because they do not maintain the 4ºC standard required for sample shipping.

2. Samples must be packed so they are surrounded and covered by a sufficient volume of ice to maintain a 4 ± 2 º C temperature immediately following collection of the samples in the field and during the entire shipping period. Ice used in the cooler must be contained in sealed, leak-proof plastic bags to prevent contact of the sample containers with melted ice.

3. When shipping packages containing samples preserved with corrosives such as hydrochloric acid, sulfuric acid, and sodium hydroxide, the samples will not meet DOT's definition of Class 8 – Corrosives because of the preservative as long as these limitations are met:

    - hydrochloric acid in water solution at a concentration of 0.04% or less by weight (pH>1.96),
    - nitric acid in water solution at a concentration of 0.15% or less by weight (pH > 1.62),
    - sulfuric acid in water solution at a concentration of 0.35% or less by weight (pH > 1.15), and
    - sodium hydroxide in water solution at a concentration of 0.08% or less weight (pH >12.30).

4. After it has been established that the samples do not meet DOT's definition of Class 8 – Corrosive because of the preservative, it must still be determined if the contaminant of concern causes the sample to meet any of DOT's hazard class definitions. If it does, appropriate identification, classification, packaging, marking, labeling, and documentation must be performed accordingly.

5. When shipping bottles that contain only preservatives, the trained shipper will attempt to meet the small quantity/excepted quantity or limited quantity requirements detailed in the DOT or IATA regulations in order to reduce preparation time, materials costs, handling hazards, and shipping costs. Complete instructions and found in the appropriate sections of the applicable regulations.

6. Per 49 CFR 172 Subpart H, an employee who performs hazardous materials (or dangerous goods) shipping is required to complete General Awareness and Function-Specific Training covering his or her particular shipping responsibilities to be updated at least every three years for domestic shipping or every two years for international shipping.

7.0 Records

All sample packaging and shipment data will be recorded in the Field Log Book for the samples shipped. The Field Log Book entries will be recorded chronologically and the time of the entry recorded first. All Field Log Book continuation pages will be sequentially numbered and the last page recorded for the day will be signed and dated by the recording technician.

Records generated as a result of this SOP will be controlled and maintained in the project record files.

8.0 Interferences

None.

9.0 References

Department of Transportation, Hazardous Materials Regulations, 49 CFR Parts 171-180.

EPA, 1996, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, Region 4, Athens, GA.

HAZWRAP, 1996. Document No. DOE/HWP-100, Standard Operating Procedure 5C, Packing and Shipping Environmental Samples.

International Air Transport Association, Dangerous Goods Regulations, current edition.

10.0 Tables

None.

11.0 Attachments

None.

12.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Decontamination of Field Equipment

Attachment 9

Revision No.: 2

Revision Date: June 2014

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1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to describe the proper methods for decontaminating downhole and sampling equipment used to perform field investigations at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by one of the following: the LHAAP technical lead or the LHAAP project manager before implementation.

Decontamination of field equipment is necessary to ensure that chemical analyses reflect actual concentrations at sampling locations by maintaining the quality of samples and preventing cross-contamination. Furthermore, decontamination reduces the health hazards to field personnel and prevents the spread of contaminants off-site.

Records generated as a result of this written procedure will be controlled and maintained in the project record files.

2.0 Health and Safety Considerations

2.1 Decontamination procedures may involve chemical exposure hazards associated with the type of contaminants encountered or solvents employed and may involve physical hazards associated with decontamination equipment. When decontamination is performed on equipment which has been in contact with hazardous materials or when the quality assurance objectives of the project require decontamination with chemical solvents, the measures necessary to protect personnel must be addressed in the project Health and Safety Plan. This plan must be approved by the project Health and Safety Officer before work commences, must be distributed to all personnel performing equipment decontamination, and must be adhered to as field activities are performed.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Decontamination. The process of removing or reducing undesirable physical and chemical constituents, from equipment or materials that come into direct contact with the sample media. Decontamination minimizes the potential for cross-contamination and ensures the representativeness of physical or chemical analyses proposed for a given sample.

Sampling Equipment. Sampling equipment includes split spoons, hand augers, bailers, submersible pumps, bowls, knives, scoops, water samplers, non-disposable filtration equipment, or any equipment that directly contacts samples.

Sample Contacting Equipment. Equipment that comes in direct contact with the sample or portion of the sample that will undergo chemical analyses or physical testing (e.g., bailer, split-spoon sampler).

Potable water. Tap water used for drinking purposes by general population.

Distilled water. Store bought distilled water.

Detergent. Laboratory grade detergent for washing equipment is recommended such as Liquinox ® or Alconox ®.

5.0 Text

5.1 Required Forms and Documentation

- Field Activity Daily Log (FADL)
- Material Safety Data Sheets

5.2 Required Materials, Equipment, or Supplies

Decontamination procedures for small equipment; downhole and heavy equipment; pumps; and downhole probes are described below separately. Each section also includes the required materials, equipment, and supplies.

5.3 Specific Requirement for Small Sampling Equipment

Before samples are collected, small sample-contacting equipment will be decontaminated appropriately. Small sampling equipment includes split spoons, bailers, knives, mixing bowls, etc. Equipment necessary to complete decontamination procedures includes:

- 5-gallon (gal) or larger plastic buckets or troughs
- Laboratory-grade detergent; Liquinox ® recommended
- Stiff-bristle brushes capable of cleaning the inside and outside of equipment
- Teflon ® sprayers or wash bottles, or 2- to 5-gal manual pump sprayer (pump sprayer material must be compatible with the solution used)
- Plastic sheeting
- Disposable wipes
- Aluminum foil
- Potable water
- Distilled water
- 10% nitric acid solution made from reagent grade nitric acid and distilled water (use only on glass, Teflon®, or stainless steel)
- Gloves, goggles, and other protective clothing as specified in the site-specific health and safety plan.

The following decontamination procedures will be followed:

1. Set up a decontamination line on plastic sheeting covering the ground or on a table covered by plastic sheeting or aluminum foil (shiny side away from equipment). At a minimum, clean plastic sheeting must be used to cover the ground beneath decontamination equipment and plastic sheeting or aluminum foil must cover tables or other surfaces where decontaminated equipment is to be placed. The decontamination area should be located away from potential contaminant sources (e.g., construction areas) to reduce or eliminate potential cross-contamination during decontamination. The decontamination area should progress from “dirty” to “clean” and end with an area for drying equipment.
2. The decontamination line should consist of several buckets or troughs in one line. The first bucket will contain a detergent solution. The next two buckets will contain potable water for rinses. A final liberal rinse of distilled water with a bottle sprayer completes the line.
3. Before washing, disassemble any items that might trap contaminants internally. Dislodge as much loose dirt as possible from equipment before beginning the decontamination process. Wash the item thoroughly in the bucket or trough of detergent solution. Use a stiff-bristle brush to dislodge any clinging dirt.
4. Rinse in second bucket or trough containing potable water. Rinse all surfaces of item. Rinse water shall be replaced as necessary (generally when water is cloudy).
5. If sampling for metals, a rinse with nitric acid in a spray bottle may be included in the decontamination process. This step is additional to the standard decontamination and is site and analysis specific.

6. Rinse a second time in the third bucket or trough. Rinse all surface of item.
7. Using a hand sprayer, rinse the item with distilled water over a fourth bucket or trough to catch the sprayed water.
8. If the equipment will have time to fully air dry before its next use, allow to air dry. If the equipment will not be allowed to fully air dry, rinse with distilled water over the last rinse bucket before reassembling or using any equipment.
9. If equipment will not be used immediately after drying, wrap in aluminum foil (shiny side out) for storage and transport.
10. Record decontamination protocol, equipment types, and date on the FADL at each occurrence.
11. After the decontamination activities are complete, collect all contaminated waters, plastic sheeting, aluminum foil, disposable gloves, boots, and clothing. Place contaminated items in properly labeled containers for disposal. Liquids and solid wastes must be drummed separately and handled in accordance with the investigation-derived waste procedure. Liquids will be disposed of at the onsite wastewater treatment plant.

5.4 Specific Requirement for Downhole and Heavy Equipment

Downhole equipment consists of nonsampling tools such as hollow-stem augers, drill pipe, bits, casing, and screen. Drill rigs, backhoes, and other heavy machinery are also included. Equipment necessary to complete decontamination procedures includes:

- Plastic sheeting or steel, prefabricated decontamination pad. See below for decontamination pad construction requirements
- Metal, wooden, or plastic sawhorses or other stands
- Laboratory-grade detergent, Liquinox ® recommended
- Steam cleaner or high pressure hot water washer capable of generating 2,500 pounds per square inch of pressure and producing steam or hot water [200 degrees Fahrenheit (ºF)], with soap compartment
- Stiff-bristle brushes
- 2- to 5-gal manual pump sprayer (pump sprayer must be compatible with the solution used)
- Potable water
- Gloves, goggles, boots, and other protective clothing as specified in the site-specific health and safety plan

Before drilling, sampling, excavating, leaving the site, and in between each location, all downhole equipment must be decontaminated. All downhole auguring, drilling, and sampling equipment shall be sandblasted (off-site) if it is new, painted, (such as split spoons or auger flights) or exhibits build-up of rust or caked material. Heavy equipment not directly used for sampling will be decontaminated at a designated area designed to contain decontamination wastes and waters. The area designated is located at the onsite wastewater treatment plant decontamination pad. If a decontamination pad is needed for site-specific requirements, a temporary pad can be constructed. The following steps must be taken when decontaminating this equipment.

1. Set up a decontamination pad that is large enough (up to the size of the drill rig) to fully contain the equipment to be cleaned. If practical, a centralized decontamination area should be established. This area should be set up to contain contaminated rinse waters and may be constructed using one or more layers of heavy plastic sheeting, 6mm or heavier, with bermed sides, a lined excavated pit, or a bermed concrete or asphalt pad. If possible, the area should be constructed to eliminate or minimize any overspray or wind-blown spray from decontamination activities (e.g., plastic sheeting secured to a wood frame surrounding the area). The decontamination area must be constructed so that fluids can be easily pumped from the area to holding containers.
2. Set up a "clean" area upwind of the decontamination pad to receive cleaned equipment for air drying. At a minimum, clean plastic sheeting must be used to cover surfaces on which decontaminated equipment is to be placed.
3. Don personal protective equipment as specified in the site-specific health and safety plan before beginning cleaning activities.
4. For heavy equipment, areas exposed to contaminated soil should be sprayed using a steam spray unit. Be sure to spray down all surfaces, including the undercarriage. It is also good practice to clean the motor, hydraulic lift, oil fill, and fuel tank area to avoid introducing contamination at the work site.
5. For smaller equipment such as augers, place the objects to be cleaned on metal or plastic-covered wooden sawhorses, supports, or decontamination trays. Using the steam-spray unit, spray the contaminated equipment. Be sure to spray inside corners and gaps; use a brush, if necessary, to dislodge dirt.
6. For steps 4 and 5, aim the sprayer downward as much as possible to avoid spraying outside the decontamination area.
7. If the condition of downhole or heavy equipment warrants using hot soapy water in the steam-spray unit, rinse the equipment with clean, clear potable water following the steam spray. If using steam spray without a detergent the potable water rinse is not necessary.
8. Remove the equipment from the decontamination area to the "clean" area to dry.
9. Record decontamination protocol, equipment types, and date on the FADL.
10. After decontamination procedures are complete, or any time the decontamination fluids fill the bermed or contained area, decontamination fluids will be collected and transferred to appropriate containers. Place all plastic and personal protective equipment into appropriate containers. All containers must be labeled properly for disposal. Liquids and solid wastes must be drummed separately and handled in accordance with the investigation-derived waste procedure. Liquids will be disposed of at the onsite wastewater treatment plant.

5.5 Specific Requirements for Pump and Pump Assemblies

Decontamination is required for any pump in which potentially contaminated fluids come into contact with any part of the pump equipment. This requirement does not apply to peristaltic pumps because water does not contact any part of the pump. Only Teflon ® or Teflon ® lined tubing should be reused for sampling after decontamination. If using poly vinyl chloride (PVC) or polyethylene tubing, discard the tubing after each use unless the tubing is used for well development, where properly-decontaminated tubing may be reused. Polyethylene or PVC tubing cannot be properly decontaminated and potential for cross-contamination during sampling remains high. This requirement

also applies to the tygon tubing fitted to the pump mechanism of a peristaltic pump. The tygon tubing shall be discarded after use.

The procedure provided below applies primarily to the decontamination of bladder pumps. A field setup may be implemented while decontaminating pumps other than bladder pumps or if frequent trips to the field office are not practical or cost effective. Equipment needed to complete decontamination procedures include:

- Distilled water
- Plastic sheeting
- Source of electricity (generator or direct line)
- Compressor and controller for bladder pumps
- Three to five decontamination cells (4-inch diameter PVC) for pumps and tubing
- Laboratory-grade detergent, Liquinox® recommended
- Gloves, goggles, boots, and other protective clothing as specified in the site-specific Work Plan

Following the use of a pump for development, purging, or sampling, the pump should be decontaminated by the following method.

1. Set up decontamination cells in a line on the plastic sheeting. Three cells are required for normal decontamination.
2. Add potable water with a small amount of detergent to the first container; add potable water alone to the second container. Add distilled water to the third container. There should be sufficient water in each container to accomplish the decontamination procedure.
3. Place one drum close enough to the decontamination area to collect the spent decontamination fluids.
4. Place the pump in the first container and pump enough water through it to equal at least three pump-and-tube-volumes. Pump the water into the waste drum. Move the pump to the second container and repeat pumping enough water through to equipment to equal at least three pump-and-tube-volumes. Repeat again with distilled water in the third cell. However, one pump-and-tube-volume of distilled water is the minimum amount required for this rinse.
5. If necessary, the pump can be disassembled and each part can be decontaminated using several buckets as described in the equipment decontamination method above.
6. Record decontamination protocol, equipment types, and date on the FADL.
7. After decontamination activities are complete, collect all contaminated water; solvents; plastic sheeting; aluminum foil; and disposable gloves, boots, and clothing. Place contaminated items in properly labeled drums for disposal. Liquids and solid wastes must be drummed separately and handled in accordance with the investigation-derived waste procedure. Liquids will be disposed of at the onsite wastewater treatment plant.

5.6 Specific Requirement for Downhole Probes

Decontamination of downhole probes, such as water level indicators, pressure transducers, downhole field parameter or data logging equipment, etc., shall be based on the contamination expected in the well and on the professional judgment of the site manager.

5.6.1 Water Level Indicator

For decontaminating water level indicators during snapshot water level sweeps, follow the steps given below:

1. Carry a detergent solution and distilled water in two separate spray bottles.
2. Spray detergent solution in a piece of paper towel and distilled water in another piece of paper towel.
3. This method involves wiping the water level indicator cable as it is pulled out of a well.
4. Grab the water level indicator cable with the two paper towels in your hands such that the detergent paper towel is below the distilled water paper towel.
5. The cable should be pulled out slowly by a second person and rolled onto the carrying wheel.
6. Once the probe is out of the well, spray it first with the detergent solution and then with distilled water. Wipe with a clean paper towel and store in the carrying case.

5.7 Restrictions and Limitations

- Fluids decontamination rinses must be stored separately until disposal is made at the onsite wastewater treatment plant.
- All distilled water must have field-blank samples collected and analyzed at the proper frequency to ensure the purity of the water.

6.0 Exception Provisions

None.

7.0 References

American Society for Testing of Materials (ASTM), 1990, *Standard Practice for Decontamination of Field Equipment Used at Radioactive Waste Sites*, D 5088-90, September.

U.S. Environmental Protection Agency (USEPA), 1991, *Handbook of Suggested Practices for the Design and Installation of Around-Water Monitoring Wells, EPA/600/4-89/034, PB 92-216886,* March.

USEPA, 1996, *Standard Field Cleaning Procedures, Appendix B, Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, USEOA Region* 4, May.

8.0 Tables

None

9.0 Attachments

None

10.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Investigation Derived Waste

Attachment 10

Revision No.: 2

Revision Date: June 2014

Contents

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1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to establish specific management practices for the handling and subsequent disposition of environmental media generated as a result of investigation actions, or investigative derived waste (IDW) at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by one of the following: the LHAAP technical lead or the LHAAP project manager before implementation.

AECOM is conducting investigation activities that generate waste materials at LHAAP. The waste materials typically consist of environmental media (i.e., drill cuttings, monitor well purge and development water), and project-related trash (e.g., inert materials such as personal protective equipment [PPE], plastic, rope, tape, paper, etc.) that are generated during well installation and sampling activities and associated site activities. When accumulated, the waste materials must be managed appropriately to minimize the exposure to human health and the environment while adhering to applicable regulatory requirements.

2.0 Health and Safety Considerations

2.1 This section presents the generic hazards associated with dealing with IDW and is intended to provide general guidance in preparing site-specific health and safety documents. The site-specific Health and Safety Plan will address additional requirements and will take precedence over this document. Note that dealing with IDW usually requires Level D personal protection unless there is a potential for exposure to airborne site contaminants.

2.2 Health and safety hazards include but are not limited to the following:

- Slip, trips, and falls in tall grasses over obstacles, and muddy conditions. Review terrain hazards prior to conducting these operations.
- Dermal exposure to potentially contaminated waste. Ensure that proper PPE is used to mitigate the impact of contact of IDW to skin and/or eyes.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

None.

5.0 Text

5.1 Required Records and Forms

- Sample Collection Log (SCL)
- Field Activity Daily Log (FADL)
- Sample tags/labels and the appropriate forms/documentation for sample shipment
- Material Safety Data Sheets
- Field Sampling Plan/Work Plan.

5.2 Required Materials, Equipment, or Supplies

- Indelible black ink pens and markers
- Appropriate sample containers
- Insulated cooler and water proof sealing tape
- Nitrile or latex loves
- Decontamination equipment and supplies, including rinse bottles and deionized water
- Personal protective clothing and gear
- Appropriate equipment and meters for obtaining field measurements

5.3 Procedures

5.3.1 Preparation

The following steps must be followed when preparing for management of IDW:

- Verify that all personnel have read and understand the approved site-specific health and safety plan and have the proper training and certifications required under Occupational Safety and Health Administration.
- Don the appropriate personal protective clothing as dictated by the site-specific health and safety plan.
- Document the sampling events, recording the information on the SCL or equivalent form as specified. Document any and all deviations from standard operating procedures on the FADL and include rationale for changes.

5.3.2 Specific Preparation

The following paragraphs detail the planned methodologies for dealing environmental media once generated during site activities.

Initial Handling Requirements

All environmental media will be managed in an effort to minimize exposure to human health and the environment. Typically, the media will be generated as a result of two major activities, drilling soil-test borings and constructing and sampling ground-water monitoring wells. In instances where soil test borings are advanced, either for the sole purpose of retrieving soil samples or to allow for the retrieval of a ground-water sample via a hydropunch or similar sampling device, including obtaining a sample from an open borehole, the following handling protocols for IDW soil will be used:

- Soil cuttings derived from investigative borings will be placed adjacent to the borehole on plastic or other suitable material capable of precluding contact with the ground surface.
- Soil cuttings will be covered daily or during rainfall events to prevent contact with moisture. Upon completion of the downhole activity (e.g., drilling, groundwater sampling, etc.), the soil cuttings will be placed back into the borehole from which they were generated.
- Replaced cuttings will be compacted to the extent practical and a 1- by 1-foot by 3-inch thick grout cap will be placed over the top of the borehole to prevent vertical migration of surface water.

In cases where a soil-test boring is advanced for the purposes of installing a groundwater monitoring well, all environmental media accumulated will be containerized to allow for characterization upon generation and situated at a designated staging area or near the point of generation. As solids are generated, they will first be placed into 55-gallon drums, or other approved containers including roll-off boxes, until they are characterized as hazardous or nonhazardous. Pending further characterization, solids may be bulked into larger approved containers situated within the work area. Liquids may be bulked upon generation unless directed otherwise. All solids and liquids will be separated prior to disposal.

After each container (e.g., drum, roll-off box, etc.) has been filled, the container and lid, if appropriate, will be labeled indicating a description of the media (i.e., soil, purge water, decon water, PPE), origin of media (e.g., sample identification such as boring or well), date the media was placed in the container, site identification (i.e., LHAAP - # #), date container was sealed and sampled, and any other pertinent information (i.e., hazardous versus nonhazardous). The containers may be labeled using a paint pen

or other indelible marker that will not fade when exposed to weather. A record of the number of containers and their contents will be completed at each generation site and will be included in the logbook before leaving each site.

At the end of each day and/or field activity, all containers will be sealed or covered in such a way to prevent the introduction of rain water or surface run-off.

A centralized staging area will be assigned for each site prior to initiation of any site work. Unless directed otherwise, the staging area will be located within the boundaries of the site where field work will take place. All filled containers generated for a given site will be placed in the central location. The containers will be moved from their original filling location to the staging area within five days of filling. In the event that conditions indicate the potential for reactive wastes, special handling and storage precautions will be utilized. The integrity of containers moved to the staging area will be monitored routinely, as required.

Waste may be transported between sites when required or in preparation for disposal activities without specific regulatory concurrence.

5.4 Characterization of Environmental Media

The characterization of environmental media will be determined by a two-step process. First, the materials will be characterized using analytical data obtained during the activity from which the materials were generated previously. As stated, it is anticipated that specific generation activities will include soil-test borings, monitoring well installations, and monitoring well purge and development actions. Water obtained from specific monitor well sampling points (i.e., purge and development water) will be characterized using groundwater sampling data taken from the specific well site from which the water was obtained. Analytical data obtained from a particular borehole reflecting soil contaminant levels will be used to characterize solids generated from that borehole. Other solids such as rock and other environmental media generated during field activities will be characterized for disposal based on the analytical results of the soil and water sampled at the specific location where the solids were generated. Analytical results from both soils and water will be used to characterize decon water. When appropriate, analytical data will be extrapolated to reflect toxicity characteristic leaching procedure (TCLP) values (i.e., 20x divisor rule for soils). Generator's knowledge may be used to evaluate the media potential for corrosivity, ignitability, and reactivity.

If analytical results indicate contaminant levels below 75 percent of TCLP values, no additional analytical testing will be performed and the media will be considered nonhazardous. When analytical results indicate that elevated contaminant levels (i.e., more than 75 percent of TCLP) are present, additional analyses will be performed. In these cases, composite samples will be taken for each type of media generated (i.e., soil, water) and for each specific generation location (e.g., monitoring well, soil boring, etc.). Samples will be taken directly from the containers. Where multiple numbers of containers are generated for a particular media and generation site, the samples will be taken to ensure that the volume of soil from which one composite sample is prepared is equivalent to no more than the volume contained by ten 55-gallon drums. The suite of analyses to be run will be determined based on suspected contaminants and any prior available analytical data. Generator knowledge may be used to minimize the volume of analytical test required to adequately characterize the media. Hazardous versus nonhazardous determinations will be made utilizing those parameters outlined in the Texas Administrative Code. All sampling and analytical testing protocols will be consistent with Texas Commission on Environmental Quality (TCEQ)/United States Environmental Protection Agency (USEPA) requirements and methodologies.

5.5 Management and Disposition

Once adequately characterized, the containers will be labeled as described. U.S. Department of Transportation approved labels will be used if transportation outside of LHAAP boundaries is required or anticipated. Waste materials may also be bulked on site (within the staging area), with like waste streams possessing compatible nonreacting characteristics. Hazardous and nonhazardous materials will be segregated and all liquids and solids will be separated. Other specific management requirements are as follows:

5.6 Waste Water

In general, all waste water (including decontamination water) generated during the described site activities will be disposed within the confines of LHAAP at the onsite groundwater treatment plant (GWTP). Other specifics are as follows:

5.6.1 Nonhazardous Wastewater

Wastewater determined to be nonhazardous (Section 40 Code of Federal Regulations [CFR] Part 261), but possessing some level of contaminants, will be disposed directly into LHAAP's GWTP.

5.6.2 Hazardous Wastewater

Hazardous wastewater will be transported, when required, and treated at an appropriate treatment facility when the following conditions are met:

1. The treatment facility meets the definition of a waste water treatment unit as defined in the Texas Administrative Code.
2. The treatment facility is capable of (a) rendering characteristically hazardous wastes nonhazardous or (b) removing listed wastes from the contaminated media so that the media no longer contains the listed waste for which the media was originally considered hazardous. If after treatment, analytical tests show the listed waste is not present above laboratory detection limits, then the contaminated media will be considered to no longer contain the listed waste and will no longer be considered hazardous.

Wastewater determined to be hazardous may be transported between sites and within LHAAP boundaries for treatment/disposition in accordance with the previously outlined provisions without specific regulatory concurrence. In the event that LHAAP does not have a facility on-line capable of treating the hazardous wastewater, the water will be taken to a fully permitted, off-site treatment/disposal facility in accordance with state and federal regulations. Unless specifically mandated by TCEQ and the USEPA, the treatment and disposal of hazardous and nonhazardous wastewater will be performed as previously described. The wastes will be treated and disposed in a timely manner so as to expedite site activities and to ensure the protection of human health and the environment. Except where noted, specific written concurrence from TCEQ and USEPA prior to those actions previously described is not required.

5.7 Solids

Solids may include soil cuttings, rock, grout, and other environmental media generated during field activities. All solids will be containerized at or near the point of generation and staged as described in Section 5.3.2. Other specific management practices are as follows:

5.7.1 Nonhazardous Solids

Soil cuttings and rock determined to be nonhazardous will be staged within the confines of the site from which they were generated. After characterizations (hazardous versus nonhazardous) are finalized and depending upon site conditions, nonhazardous cuttings will be removed from containers and replaced "at or near" the location from which they were derived. "At or near" infers a media will be placed as near to its point of origin as is practical. Examples would be placing monitoring well cuttings around the monitoring well from which they originated as opposed to within it. However, when not practical, the media may be centrally located within the confines of the originating site in an area of minimal traffic and where the media could be managed in a manner protective of human health and the environment.

In the event that site conditions are not conducive to the replacement of the materials, soils exhibiting contaminant levels below analytical detection limits are considered non-regulated and will be disposed at the discretion of LHAAP representatives.

5.7.2 Hazardous Solids

For management and disposition purposes, the solids will be broken into two major categories: those exhibiting hazardous characteristics and those containing listed hazardous waste.

Solids exhibiting hazardous characteristics or that contain a listed hazardous waste will be stored upon generation "at or near" the point of generation within the site of origin or bulked in anticipation of disposal activities at a centralized location at LHAAP. Secondary containment will not be required for the storage of hazardous solids as long as the containers are secure and monitored routinely for releases. Unless otherwise directed, the solids will not be subject to 90-day storage requirements.

Whenever practical and depending upon actual site conditions, containerized solids that do not possess hazardous characteristics but do contain listed wastes, will be removed from their storage containers and replaced "at or near" the location from which they were derived. The solids may be replaced anytime after characterization is complete, but most likely at the end of the project phase. Once replaced, the materials will be managed in a manner as to minimize surface erosion. Because of the known presence of contaminants, the solids will be managed in a manner protective of human health and the environment.

The disposition of solids possessing hazardous characteristics will be determined on a case-by-case basis depending on specific contaminants, concentrations, and site conditions. The solids will be returned (i.e., from storage containers) to the site from which they were generated and the remediation of the media, if required, will be addressed, at which time a remedial plan is prepared for other contaminated soil at the site. Prior to this replacement, a request detailing the planned placement procedures with a site sketch indicating the planned placement location will be provided.

In the event that hazardous solids are not allowed to be returned to the site and onsite treatment is not available, the media will be disposed off-site in accordance with state and federal requirements in a permitted disposal facility, as required.

5.8 Trash

Trash includes nonhazardous solids such as spent PPE, plastic sheeting, rope and unused monitor well construction materials generated during field activities. These materials will be placed into dumpsters or roll-offs for disposal at a permitted solid waste disposal facility.

6.0 References

U.S. Environmental Protection Agency (USEPA), 1991, *Management of Investigative-Derived Wastes During Site Inspections, Office of Research and Development, Publication, EPA/540/G-91/009*, May 1991.

USEPA, 1992a, *Guide to Management of Investigative-Derived Wastes, Office of Solid Waste and Emergency Response, Publication 9345.3-03FS*, April 1992.

USEPA, 1992b, *Management of Contaminated Media, Region IV EPA, Guidance Number TSC-92-02,* December 28, 1992.

7.0 Tables

None.

8.0 Attachments

None.

9.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Monitoring Well and Boring Abandonment Procedures

Attachment 11

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Monitoring Well and Boring Abandonment Procedures

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1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines and procedures for field personnel to use in the supervision of borehole and groundwater monitoring well abandonment (destruction) activities at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

Any exceptions to the requirements are addressed in the section entitled "Exception Provision." Documents other than those required by the contract and consulted in the preparation of this SOP are listed under "Cross Reference."

The goals of borehole and monitoring well abandonment are to:

- Prevent vertical migration of fluids in the borehole or monitoring well being abandoned;
- Prevent intermixing of waters from different water-bearing zones;
- Eliminate physical hazards (e.g., open boreholes); and
- Preserve aquifer properties.

The abandonment methodology that is used at a site is dependent upon specific regulatory requirements, and may actually be negotiated with the applicable regulatory agencies. Two general methods of abandonment are applicable to address the goals and objectives stated above.

- In-place abandonment of monitoring well
- Removing the well and associated materials from the aquifer

Abandoning the well in place basically consists of filling and isolating the screened interval and cementing the casing in place, usually with a cement bentonite grout. The grout is commonly pumped through a tremie pipe inside the well. Abandonment in place can be considered when no cross-contamination can occur between various zones and contamination cannot enter from the surface.

Certain conditions may require perforating the well casing prior to grouting the well in place. Such conditions include excess sand pack interval (i.e., behind blank casing), and/or intervals of poor cement seal (as determined from a cement bond log run inside the casing). The grouting is then conducted in successive stages across the perforated intervals. In other instances, the regulatory agencies may require in-place abandonment be conducted using pressure grouting techniques.

Removal of the well materials is performed by over-drilling or pulling and/or drilling out the materials. Hollow stem auger drilling is most commonly used, but air or mud rotary drilling with a washover casing are other options. The drill string size is selected so that the inside diameter of the drill string is slightly greater than the well casing and screen. Using hollow stem augers as an example, the auger is centered over the casing with the center plug and pilot bit removed, or a small guide plug inserted in the casing. The cement seal, bentonite seal, and sand pack is then drilled out with the augers as they

are advanced or washed over the well casing and screen. Once the cement seal, bentonite seal, and sand have been drilled out and circulated to the surface, the well casing and screen are then pulled from the hole. The remaining boring is then usually sealed with a tremied cement grout.

If the monitoring well is shallow enough, pulling out the casing and drilling out the remaining well materials is commonly done. If the well casing can't be removed, then drilling out the casing along with the well material can be conducted using a hollow-stem auger or mud rotary drilling method.

The above methodologies also commonly incorporate the removal of the well head and surface completion materials down to a pre-specified depth. The surface is then sealed and a permanent marker or monument may also be emplaced at the surface.

Any of the above methodologies are effective in rendering the wells inoperable and preventing them from becoming conduits for enhanced vertical transport.

2.0 Health and Safety Considerations

- All maintenance and servicing of the instrumentation should be performed in a safe area, away from hazardous locations.
- Refer to the Site Specific Health and Safety Plan for additional Health and Safety issues.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that all abandonment activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.3 Field Team

All field team members assigned to borehole and well abandonment activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Field Team Leader.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, and issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Borehole Abandonment - The process whereby boreholes are grouted or sealed following completion of drilling, sampling and/or logging.

Bridging - The process where material poured or dropped from the ground surface down a borehole or tremie pipe jams and causes a blockage. This impedes the material from reaching the bottom of the borehole.

Casing splitter - A device attached to the drill string that breaches the well casing allowing communication between the inside of the well and the annular space.

Grout - Sealing material that is composed of cement, bentonite, or a cement-bentonite mixture.

Native material - Naturally occurring geologic materials found at the site.

Over-drilling - Drilling where the existing well passes up the inside diameter of the drill string and the material in the annular space is removed from the boring.

Perforation - A breach (slot or hole) created in the well casing to allow communication between the inside of the well and the annular space.

Plugging - The process of placing a material in the well or borehole such as grout that has a lower hydraulic conductivity than the surrounding geologic formation so that the borehole or well will not act as a conduit for the vertical migration of surface water or groundwater.

PVC - Polyvinyl chloride is the material in which the monitoring well casing and screen are constructed.

Tremie Pipe - A pipe that is inserted into a well or borehole to transport grout or other well materials as a liquid or slurry from the ground surface to a specified depth.

Well Abandonment - For the purposes of this SOP, well abandonment will refer to the abandonment of groundwater monitoring wells only. Well abandonment is the process of destroying a well such that it may never be used again and will not serve as a conduit for vertically migrating fluids.

5.0 Procedures, Equipment and Supplies

5.1 Required Records and Forms

- Field Log Book
- Well Abandonment Forms
- Site Specific Health and Safety Plan
- Appropriate Standard Operating Procedures

5.2 Required Materials, Equipment, or Supplies

- Indelible black-ink pens and markers
- Copies of the well construction form and/or boring log
- Decontamination equipment and supplies
- Personal protective clothing and gear
- Drill rig with appropriate drill rods, bits, and tools
- Grout mixing equipment
- Grout pumping equipment
- Tremie pipe equipment
- Bentonite
- Portland cement (American Society for Testing and Materials [ASTM] Type I or Type II)

5.3 General Requirements

This section contains responsibilities, procedures and requirements for borehole and well abandonment. Abandonment procedures to be used at a particular site must incorporate project-specific regulatory requirements. Consequently, the Work Plan will identify the following pre-abandonment field activities:

- Abandonment objectives
- Boreholes to be abandoned
- Monitoring wells to be abandoned
- Specific procedures for borehole and well abandonment beyond those covered in this SOP
- Applicable site-specific regulatory requirements for monitoring well abandonment

5.4 Specific Requirements for Abandonment of Boreholes

Methods of borehole abandonment differ based on the diameter of the borehole, the depth of the borehole, and condition of the borehole (i.e., water column thickness, soil type).

5.4.1 Hydropunch Boreholes (less than 4-inch diameter)

1. Upon removal of direct push rods from boreholes, the open borehole will be filled with grout from the bottom using a tremie pipe.
2. Using a decontaminated weighted tape, measure the total depth of the borehole.
3. Calculate the volume of the borehole using the formula found in Figure 1 of this SOP. This calculation should be performed in the field log book. This volume will be useful to determine the minimum volume of grout needed and should be compared to the volume of grout actually used to document that bridging did not occur. Comparison to the theoretical amount required will also indicate the presence of void spaces adjacent to the borehole.

4. Mix the grout to be used for sealing the well. Grout is a mixture of ASTM C150 Portland Type I or II cement, water, and bentonite. (Type II cement should be used in applications where higher sulfate resistance is required than Type I cement can provide.) Organic-free granular bentonite is added at a rate of 3 to 5 pounds of bentonite per 94-pound sack of cement to produce a grout that is roughly 3 to 5 % bentonite by weight. To the cement-bentonite mix add 6.5 to 7.8 gallons of water to create a pumpable slurry. Refer to the table in Figure 2 of this SOP to determine the actual water volume required for the percentage bentonite being mixed, and for grout volumes produced at differing bentonite/water/cement ratios.
5. Remove the drill string and bit from the borehole. The mud utilized during the drilling activities should prevent any sloughing of the borehole wall.
6. Assemble and insert a decontaminated tremie pipe into the borehole.
7. When the grout is thoroughly mixed, begin pumping the grout down the tremie pipe. The tremie pipe should be raised as the borehole fills with grout; however, the tip of the tremie pipe should remain submerged in the top of the grout column.
8. If the boring is completed into asphalt or cement (e.g., parking lots, sidewalks, runways, etc.) the upper 1 foot of the boring will be completed with a like material. For example, if the boring was advanced through an asphalt parking lot, the upper 1 foot will be completed with asphalt patching material.

5.4.2 Auger Boreholes (4-inch diameter or greater)

Auger boreholes 4 inches in diameter or greater may be abandoned either by grouting the borehole as described in section 5.4.1 above, or by placement of bentonite pellets. When bentonite pellets are used, the following steps will be followed:

1. Upon removal of the augers from the open borehole, the bentonite pellets will be slowly poured into the borehole. Care should be taken to assure that the feed rate of the bentonite pellets is not greater than 10 pounds per minute to avoid bridging down-hole. In case there is a potential for hole collapse, the augers can be left in the borehole as the bentonite pellets are poured through the augers. The augers can be incrementally lifted out of the hole as the bentonite is being added.
2. For dry boreholes or dry segments of boreholes, potable water will be added to hydrate the bentonite pellets.
3. If the boring is completed into asphalt or cement (e.g., parking lots, sidewalks, runways, etc.). The upper 1 foot of the boring will be completed with a like material. For example, if the boring was advanced through an asphalt parking lot, the upper 1 foot will be completed with asphalt patching material.

5.4.3 Mud Rotary Boreholes

1. Using a decontaminated weighted tape, measure the total depth of the borehole.
2. Calculate the volume of the borehole using the formula found in Figure 1 of this SOP. This calculation should be performed in the field log book. This volume will be useful to determine the minimum volume of grout needed and should be compared to the

volume of grout actually used to document that bridging did not occur or that void spaces were encountered during the drilling.

3. Mix the grout to be used for sealing the well. Grout is a mixture of ASTM 50-C Portland Type I or II cement, water, and bentonite. Type II cement should be used only in applications where the groundwater contains high concentrations of dissolved sulfates and groundwater pH is neutral or basic. Organic-free granular bentonite will be added at a rate of 3 to 5 pounds of bentonite per 94 pound sack of cement to produce a grout that is roughly 3 to 5 % bentonite by weight. To the cement-bentonite mix add 6.5 to 7.8 gallons of water to create a pumpable slurry. Refer to the table in Figure 2 of this SOP to determine the actual water volume required for the percentage bentonite being mixed, and for grout volumes produced at differing bentonite/water/cement ratios.
4. Remove the drill string and bit from the borehole. The mud utilized during the drilling activities should prevent any sloughing of the borehole wall.
5. Assemble and insert a decontaminated tremie pipe into the borehole.
6. When the grout is thoroughly mixed, begin pumping the grout down the tremie pipe. The tremie pipe should be raised as the borehole fills with grout; however, the tip of the tremie pipe should remain submerged in the top of the grout column.
7. The rise of the grout column should also be visually monitored or sounded with a weighted tape. The drilling mud being displaced as the grout is added will need to be pumped into 55 gallon drums or hoppers to be transported and disposed in a roll-off box.
8. In the event that highly cavernous bedrock conditions are encountered and there is significant grout loss, additional measures may be taken. These may include, but are not limited to the addition of bentonite pellets to plug the borehole, use of additives such as calcium chloride to speed up the grout setting time, use of grout baskets or the addition of lost-circulation materials to plug the borehole. All of these procedures may be used to plug the borehole so that it can be grouted according to the procedures listed in steps 1-8.
9. During the grouting process, the drilling hands performing the task should be supervised to assure that potentially contaminating material (e.g., oil, grease, or fuels from gloves, pumps, hoses, et. al) does not enter the grout mix and that personnel are properly wearing personal protective equipment as specified in the project Health and Safety Plan.
10. After grouting, barriers should be placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes will typically require at least a second visit to "top off" the hole. Repeat visits as necessary.
11. The surface hole condition should match the pre-drilling condition (e.g., asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.

5.5 Specific Requirements for Abandonment (Destruction) of Wells

The aquifer properties, well materials, well construction type, and status and type of contamination at the site should be considered when selecting a method of well abandonment. In general, two

methods of monitoring well abandonment are presented here. The first involves abandoning the well in place, leaving the well materials in the ground and either grouting the casing intact or splitting the casing and grouting the well under pressure. The second method involves the removal of the casing, well materials (sandpack, bentonite seal, and annular seal) and grouting the remaining boring to the surface.

5.6 Specific Requirements for Pre-Abandonment Activities

Plans for abandonment presented should be reviewed by the field crew. The procedures for the abandonment within the plan should be consistent with applicable regulatory requirements. Certain information may be required prior to the abandonment activities. This information may include the following:

- The subsurface lithology/soil types in the immediate vicinity of the well, as derived from the boring, soil core and/or borehole geophysical logs compiled from the particular well.
- Knowledge of depth to bedrock, cavities/fractures in bedrock, or prior well construction problems.
- The well condition information based upon historical or operations records (including sample collection forms) and previous inspection activities (e.g., tape soundings, video camera logging, borehole geophysical logging, etc.).
- The well construction information, including type and diameter of casing and well screen, and depths, composition and thicknesses of sand packs, bentonite seals and cement seals.
- Past analytical results of groundwater samples collected from the well.

5.7 Specific Requirements for In-Place Well Abandonment

Two general methods of in-place well abandonment (cementing) are discussed in this section. One method leaves the well intact and can be used when the construction details of the well are known and it is known to have a competent annular seal. The second method of in-place abandonment involves breaching the well casing and pumping grout into the well and into the surrounding formation around the well.

5.7.1 In-Place Abandonment with the Casing Intact

1. Upon initiation of abandonment activities, all downhole sampling (e.g., dedicated purge pumps, sample pumps, etc.) and monitoring equipment must be removed from the well.
2. Obtain a measurement of the total depth of the well and compare to the existing well construction information. Record this information on the well abandonment log and the field log book.
3. If granular material (e.g., sand pack, formation sediment, etc.) is believed present inside the well based upon the sounding, a bailer may be run to bottom to attempt to ascertain the type of debris.
4. The granular well debris should then be removed from the well by bailing, pumping or other appropriate techniques if it is determined that the debris will act as a conduit for groundwater migrating between different aquifers.
5. If the condition of the well casing is suspected to be of concern it may be advisable to run a video log of the well, if it has not already been done. However, judgment and

caution will need to be exercised to prevent sticking the camera inside the well construction during the video logging.

6. If significant scaling or encrustation of the well is observed the well should then be brushed, cleaned, and the free material removed by pumping or bailing.
7. Calculate the volume of the screened interval, as determined from the construction log, using the formula provided in Figure 1 of this SOP. This calculation should be documented on the field log book.
8. Fill the screened interval with bentonite pellets to 4 feet above the top of the screen. The material should be poured slowly to ensure that bridging does not occur.
9. Sound the top bentonite with a decontaminated weighted tape. Record this measurement on the abandonment form and on the field log book. Sufficient time should be allowed to ensure that all of bentonite has settled prior to this final measurement.
10. Mix the grout to be used for sealing the well. Grout is a mixture of ASTM 50-C Portland Type I or II cement, water, and bentonite. Type II cement should be used only in applications where the groundwater contains high concentrations of dissolved sulfates and groundwater pH is neutral or basic. Organic-free granular bentonite will be added at a rate of 3 to 5 pounds of bentonite per 94 pound sack of cement to produce a grout that is roughly 3 to 5 % bentonite by weight. To the cement-bentonite mix add 6.5 to 7.8 gallons of water to create a pumpable slurry. Refer to the table in Figure 2 of this SOP to determine the actual water volume required for the percentage bentonite being mixed, and for grout volumes produced at differing bentonite/water/cement ratios.
11. Assemble and insert a decontaminated tremie pipe into the borehole.
12. When the grout is thoroughly mixed begin pumping the grout down the tremie pipe. The tremie pipe should be raised as the borehole fills with grout; however, the tip of the tremie pipe should remain submerged in the top of the grout column.
13. The rise of the grout column should also be visually monitored or sounded with a weighted tape.
14. Remove pads, posts and cut off casings to one foot below grade and seal with bentonite or cement grout.
15. After grouting, barriers should be placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes will typically require at least a second visit to "top off" the hole. Repeat visits as necessary.
16. The surface hole condition should match the pre-drilling condition (e.g., asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.

5.7.2 In-Place Abandonment with Breached Casing

1. Upon initiation of abandonment activities, all downhole sampling (e.g., dedicated purge pumps, sample pumps, etc.) and monitoring equipment must be removed from the well.

2. Obtain a measurement of the total depth of the well and compare to the existing well construction information. Record this information on the well abandonment log and the field log book.
3. If granular material (e.g., sand pack, formation sediment, etc.) is believed present inside the well based upon the sounding, a bailer may be run to the bottom in an attempt to ascertain the type of debris.
4. The granular well debris should then be removed from the well by bailing, pumping or other appropriate techniques if it is determined that the debris will act as a conduit for groundwater migrating between different aquifers.
5. If the condition of the well casing is suspected to be of concern it may be advisable to run a video log of the well, if it has not already been done. However, judgment and caution will need to be exercised to prevent sticking the camera inside the well construction during the video logging.
6. If significant scaling or encrustation of the well is observed the well should then be brushed, cleaned, and the free material removed by pumping or bailing.
7. Calculate the volume of the screened interval, as determined from the construction log, using the formula provided in Figure 1 of this SOP. This calculation should be performed in the field log book.
8. Fill the screened interval with or bentonite to 4 feet above the top of the screen. The material should be poured slowly to ensure that bridging does not occur.
9. Sound the top bentonite with a decontaminated weighted tape. Record this measurement on the abandonment form and on the field log book. Sufficient time should be allowed to ensure that all of the bentonite has settled prior to this final measurement.
10. Install the casing splitter into the well riser and advance it to a depth 3 to 5 feet above the top of the bentonite. This should result in a well casing that is breached on multiple sides at a point near the top of the bentonite.
11. Pressure grout the casing until grout is returned at the surface.
12. After grouting, barriers should be placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes will typically require at least a second visit to "top off" the hole. Repeat visits as necessary.
13. The surface hole condition should match the pre-drilling condition (e.g., asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.

5.8 Specific Requirements for Abandonment with Well Removal

This section describes basic requirements for monitoring well abandonment by drilling the well out. The drilling technique used depends on the well material. For PVC wells, hollow-stem auger drilling techniques are most commonly employed. For stainless and mild steel casings a washover casing and air-rotary drill rig will be used.

5.8.1 Over-drilling PVC, Teflon, and Other Plastic-Type Casings

1. Upon initiation of abandonment activities, all down-hole sampling (e.g., dedicated purge pumps, sample pumps, etc.) and monitoring equipment must be removed from the well.
2. Obtain a measurement of the total depth of the well and compare to the existing well construction information. Record this information on the well abandonment form and in the field log book.
3. If granular material (e.g., sand pack, formation sediment, etc.) is believed present inside the well based upon the sounding, a bailer may be run to bottom to attempt to ascertain the type of debris.
4. The granular well debris should then be removed from the well by bailing, pumping or other appropriate techniques.
5. If significant scaling or encrustation of the well is observed the well should then be brushed, cleaned, and the free material removed by pumping or bailing.
6. If the condition of the well casing or screen is suspect (e.g., parting is suspected) a video log may be run inside the well. If parting of the casing or screen is evident, drilling the well out may not be feasible and abandoning the well in-place may need to be considered as a more viable option.
7. Prepare the site for drill rig access so that the rig can be centered over the well. The lead auger is positioned such that it will wash over the well casing during drilling. A small guide plug may then be positioned through the inside of the auger and into the casing.
8. The cement seal and sand pack are then drilled out by advancing the augers and adding auger joints to the drill string. Drilling should be conducted following procedures specified in applicable drilling method SOPs and regulatory guidance.
9. Advance the borehole to at least the depth equal to the total depth of the boring containing the well. If possible the over-drilling should continue to 0.5 ft beyond the well total depth. The boring should be cleaned by circulating the augers. This will remove the cement, sand pack and cuttings.
10. The well casing is then removed using casing jacks, drill line or other appropriate methods. If the casing is disconnected during removal it is advisable to suspend and hold the casing with slips. Care should be taken to prevent the remaining casing from falling back into the hole.
11. Using a decontaminated weighted tape, measure the total depth of the borehole.
12. Calculate the volume of the borehole using the formula in Figure 1 of this SOP. This calculation should be performed in the field log book. This volume will be useful to determine the minimum volume of neat grout needed and should be compared to the volume of grout actually used to assure that bridging did not occur. For rough calculation assume that one 94-pound sack of cement (when mixed with 5 gallons of water) will fill approximately cubic foot of space. The addition of 3 to 5 pounds of granular bentonite (3 to 5% bentonite by weight) and additional water will change the volumes slightly.

13. Assemble and insert a decontaminated tremie pipe into the borehole.
14. When the grout is thoroughly mixed begin pumping the grout down the tremie pipe. The tremie pipe should be raised as the borehole fills with grout; however, the tip of the tremie pipe should remain submerged in the top of the grout column.
15. The rise of the grout column should also be visually monitored or sounded with a weighted tape until undiluted grout is at the surface.
16. After grouting, barriers should be placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes will typically require at least a second visit to "top off" the hole. Repeat visits as necessary.
17. The surface hole condition should match the pre-drilling condition (e.g., asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.
18. The final well surface disposition should be completed as stated in the abandonment and/or project work plans.
19. Any problems or unusual conditions observed during the entire abandonment process should be recorded in the field log book. A well abandonment form, found in Figure 1 of this SOP, should also be completed for the well during and upon completion of abandonment activities to provide appropriate documentation.

5.8.2 Pulling/Drilling PVC, Teflon, and Other Plastic-Type Casings

1. Upon initiation of abandonment activities, all downhole sampling (e.g., dedicated purge pumps, sample pumps, etc.) and monitoring equipment must be removed from the well.
2. Obtain a measurement of the total depth of the well and compare to the existing well construction information. Record this information on the well abandonment form and in the field log book.
3. Remove the well box and concrete pad to expose the well casing.
4. An attempt should be made to pull the casing using a drill line or other appropriate methods. If the casing is removed then the well materials down-hole may be drilled out using hollow-stem auger or mud-rotary drilling techniques. If the casing cannot be pulled out of the borehole then use a hollow-stem auger or mud rotary drill rig to drill out the casing and associated well materials or abandon in place as described above. A small stinger may be used to help guide the drill bit though the center of the borehole.
5. Drill out the monitoring well to the total depth of the well. If possible drilling should continue to 0.5 ft beyond the bottom of the well. Continue rotating the augers, or circulating drilling mud if using mud rotary drilling to clear out well material from the borehole.
6. Using a decontaminated weighted surveyor’s tape, measure the total depth of the borehole.
7. Calculate the volume of the borehole using the formula in Figure 1 of this SOP. This calculation should be performed in the field log book. This volume will be useful to determine the volume of neat grout needed and should be compared to the volume of

grout actually used to assure that bridging did not occur. For rough calculation assume that one 94 Lb. sack of cement (when mixed with 5 gallons of water) will fill approximately cubic foot of space. The addition of 2 to 5 pounds of granular bentonite (2 to 5% bentonite by weight) and additional water will change the volumes.

8. .Assemble and insert a decontaminated tremie pipe - into the borehole.
9. When the grout is thoroughly mixed begin pumping the grout down the tremie pipe. The tremie pipe should be raised as the borehole fills with grout; however, the tip of the tremie pipe should remain submerged in the top of the grout column.
10. The rise of the grout column should also be visually monitored or sounded with a weighted tape until undiluted grout is at the surface.
11. After grouting, barriers should be placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes will typically require at least a second visit to "top off" the hole. Repeat visits as necessary.
12. The surface hole condition should match the pre-drilling condition (e.g., asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.
13. The final well surface disposition should be completed as stated in the abandonment and/or project work plans.
14. Any problems or unusual conditions observed during the entire abandonment process should be recorded in the field log book. A well abandonment form, found in Figure 1 of this SOP, should also be completed for the well during and upon completion of abandonment activities to provide appropriate documentation.

5.8.3 Stainless Steel and Mild Steel Casing

1. Upon initiation of abandonment activities, all downhole sampling (e.g., dedicated purge pumps, sample pumps, etc.) and monitoring equipment must be removed from the well.
2. Obtain a measurement of the total depth of the well and compare to the existing well construction information. Record this information on the well abandonment form and in the field log book.
3. If granular material (e.g., sand pack, formation sediment, etc.) is believed present inside the well based upon the sounding, a bailer may be run to bottom to attempt to ascertain the type of debris.
4. The granular well debris should then be removed from the well by bailing, pumping or other appropriate techniques if it is determined that the debris will act as a conduit for groundwater migrating between different aquifers.
5. If significant scaling or encrustation of the well is observed the well should then be brushed, cleaned, and the free material removed by pumping or bailing.
6. If the condition of the well casing or screen is suspect (e.g., parting is suspected) a video log may be run inside the well. If parting of the casing or screen is evident, drilling the well out may not be feasible and abandoning the well in-place may need to be considered as a more viable option.

7. Prepare the site for drill rig access so that the rig can be centered over the well. Center the well casing inside the washover casing.
8. Advance the washover casing over the well casing using an air-rotary or mud-rotary drill rig. The washover casing should be advanced to at least the depth equal to the total depth of the boring containing the well.
9. Remove the washover casing from the borehole.
10. The well casing is then removed using casing jacks, drill line, crane or other appropriate methods. If the casing is disconnected during removal it is advisable to suspend and hold the casing with slips. Care should be taken to prevent the remaining casing from falling back into the hole.
11. Using a decontaminated weighted tape, measure the total depth of the borehole.
12. Calculate the volume of the borehole. This calculation should be performed in the field log book. This volume will be useful to determine the minimum volume of neat grout needed and should be compared to the volume of grout actually used to that bridging did not occur. Assume that one 94 Lb. sack of cement (when mixed with 5 gallons of water) will fill approximately one cubic foot of space. The addition of 2 to 5 pounds of granular bentonite (2 to 5% bentonite by weight) and additional water will change the volumes.
13. Measure the grout weight using a mud balance. The weight will be recorded on the field log book.
14. Assemble and insert a decontaminated tremie pipe into the borehole.
15. When the grout is thoroughly mixed begin pumping the grout down the tremie pipe. The tremie pipe should be raised as the borehole fills with grout; however, the tip of the tremie pipe should remain submerged in the top of the grout column.
16. The rise of the grout column should also be visually monitored or sounded with a weighted tape.
17. After grouting, barriers should be placed over grouted boreholes as the grout is likely to settle in time, creating a physical hazard. Grouted boreholes will typically require at least a second visit to "top off" the hole. Repeat visits as necessary.
18. The surface hole condition should match the pre-drilling condition (e.g., asphalt, concrete, or smoothed flush with native surface), unless otherwise specified in the project work plans.
19. Any problems or unusual conditions observed during the entire abandonment process should be recorded in the field log book. A well abandonment form, found in Figure 1 of this SOP, should also be completed for the well during and upon completion of abandonment activities to provide appropriate documentation.

For each well abandoned, the activities, calculations, locations, and materials used should be recorded on the field log book. A well abandonment form will also be completed. Portions of this form are taken directly from existing boring and construction logs and may be completed prior to arriving at the site. The remaining information is to be competed while on site during the abandonment process. Entries to the field log book, or well abandonment form are should be completed in a timely manner. The general

guidelines of documentation will be followed. Records generated as a result of this SOP will be controlled and maintained in the project record files.

6.0 Data and Records Management

All information pertinent to the collection of sediment samples should be recorded on the field log books and/or the Sample Collection Forms. An example Well Abandonment Form is presented in Figure 2. At a minimum, the following information shall be recorded in the field log book and abandonment logs:

- Project name (include site name and LHAAP identification number)
- Date and times of activities
- Well locations
- Level of PPE required
- Weather or other environmental conditions
- Equipment used (include serial numbers of field instruments)
- Any deviation to the approved work plan
- Notation of any visitors to the site.

All monitoring wells, remediation wells, injection wells, boreholes, and piezometers shall be abandoned as defined in the District Rules, Pineywoods Groundwater Conservation District, Revised January 13, 2011. These rules include all the requirements of 16 Texas Administrative Code §76.1000 (Technical Requirements – Location and Standards of Completion for Wells). A Texas Licensed Driller will be required to complete the abandonment of the wells and the well construction or abandonment forms for the Texas Water Development Board. All well construction and abandonment forms shall be sent to the Texas Water Development Board.

7.0 Exception Provisions

None

8.0 Cross References

American Standard of Testing and Materials (ASTM), 1990, Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers, ASTM Designation D 5092 - 90, October (Reapproved 1995).

ASTM, 2012, Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities, D 5299 – 99 (Reapproved 2012).

Driscoll, F. G., 1986, Groundwater and Wells, (second edition, Johnson Division, St. Paul , Minnesota, 1089 pp.

Texas Administrative Code, Title 16, Part 4, Chapter 76, Rule §76.104, Technical Requirements – Standards for Capping and Plugging Wells that Penetrate Undesirable Water or Constituent Zones.

U.S. Army Corps of Engineers, 1998 Engineering and Design Monitoring Well Design, Installation, and Documentation, at Hazardous, Toxic, and Radioactive Waste Sites, EM 1110-1-4000, November.

U.S. Environmental Protection Agency (USEPA), 1975, Manual of Water Well Construction Practices, EPA/570/9-754)1.

USEPA, September 1987, Compendium of Superfund Field Operations Methods, EPA 540/P-87/001a, OSWER 9355.0-14.

USEPA, August 1988, EPA Guidelines for Conducting Remedial Investigation and Feasibility Studies under CERCLA, Interim Final OSWER Directive 9355.3-01.

9.0 Tables

None

10.0 Figures

Figure 1 – Formulas and other Useful Information

Figure 2 – Well Abandonment Forms

11.0 Revision History

Revision	Date	Changes
0	May 2011	Shaw, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Figure 1 - Formulas and Other Useful Information

Grout Slurry Densities (HAZWRAP, 1996)

Percentage (by weight) Bentonite	Water to Cement Ratio	Minimum Density in Pounds per Gallon	Volume in Ft^3 per Sack of Cement
3	6.5 gal/Sack of Cement	14.4	1.45
4	7.2 gal/Sack of Cement	14.1	1.55
5	7.8 gal/Sack of Cement	13.8	1.64

The formula for calculating the well or borehole volume is: $\mathbf{V = \pi r^2 d}$**, where**

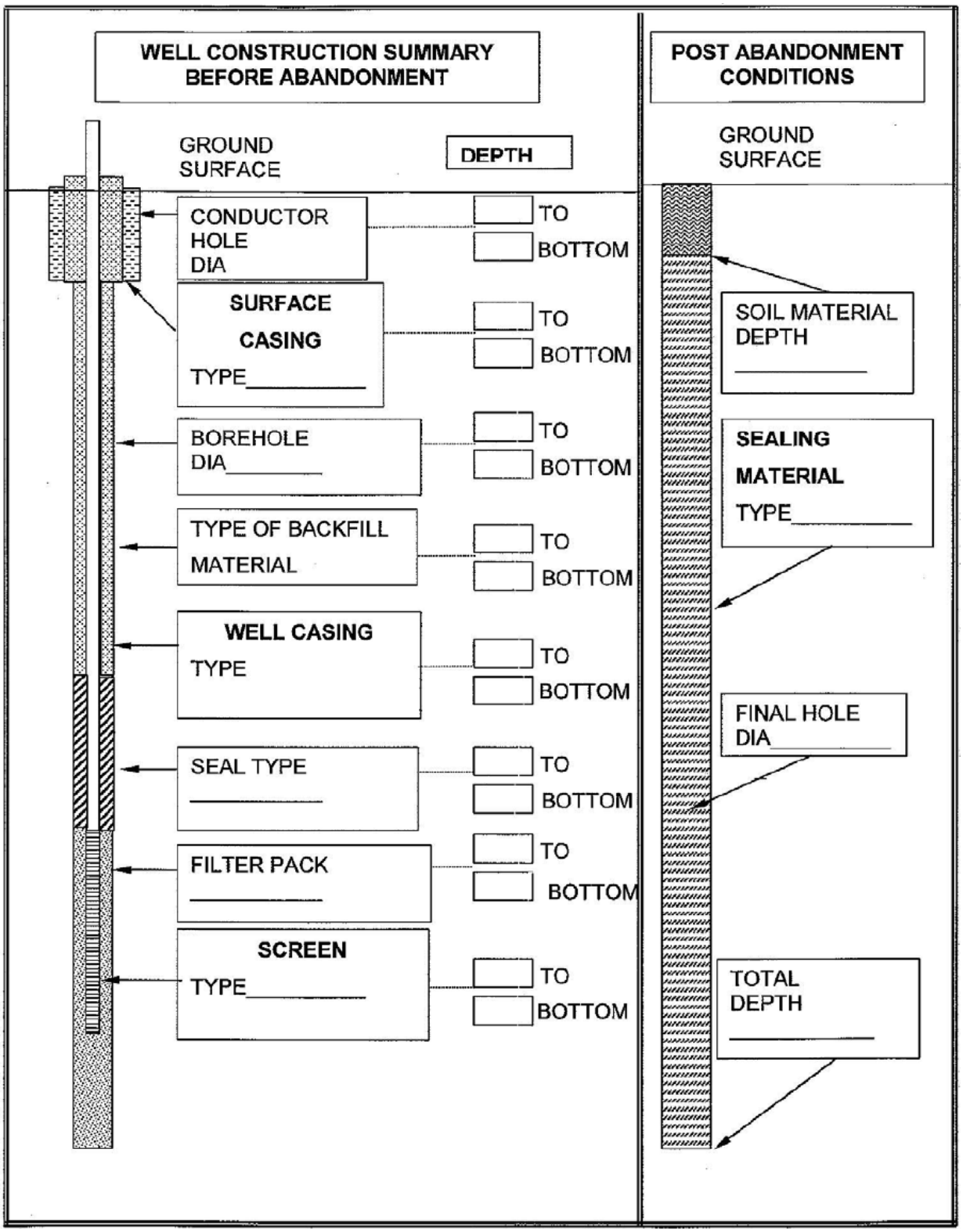
V = well or borehole volume in cubic feet (ft^3)
r = borehole or well diameter in feet (ft)
d = depth of well or borehole in feet (ft)

Figure 2 - Well Abandonment Form

Project:		Well No:	
Client:		Coordinates:	
Project No:		N	E
Date Begun:	Date Completed:	Prepared By:	Reference Point for Measurements:
Well Type: (circle one) Overburden Bedrock Extraction Temporary Other_____		NOTES:	
BEFORE ABANDONMENT		AFTER ABANDONMENT	
WELL CONSTRUCTION SUMMARY (see diagram on back of form)			
Well No.:	Location:		
TD:	Drilled By:		
Date Completed:	Ground Elev.:		
	TOC Elev.:		

	NO	YES	N/A
Concrete Pad Removed			
Protective Posts Removed			
Surface Casing Removed			
Flush Mount Removed			
(see diagram on back of form)			

SITE SKETCH


WELL CONSTRUCTION SUMMARY BEFORE ABANDONMENT
POST ABANDONMENT CONDITIONS
GROUND SURFACE
DEPTH
GROUND SURFACE
CONDUCTOR HOLE DIA
TO
BOTTOM
SURFACE CASING
TYPE_____
TO
BOTTOM
BOREHOLE DIA_____
TO
BOTTOM
TYPE OF BACKFILL MATERIAL
TO
BOTTOM
WELL CASING
TYPE
TO
BOTTOM
SEAL TYPE
_____
TO
BOTTOM
FILTER PACK
_____
TO
BOTTOM
SCREEN
TYPE_____
TO
BOTTOM
SOIL MATERIAL DEPTH
_____
SEALING MATERIAL
TYPE_____
FINAL HOLE DIA_____
TOTAL DEPTH
_____

Standard Operating Procedure

Monitoring Well Installation Procedures

Attachment 12

Revision No.: 2

Revision Date: June 2014

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1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to define the requirements for the installation of monitoring wells at the Longhorn Army Ammunition Plant (LHAAP) located in Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP. Deviations from the SOP will be captured in field documentation and noted in reports submitted to regulatory agencies.

The purpose of monitoring well installation is to provide access to groundwater for collecting samples, as well as for obtaining water levels and other data. Monitoring wells are potential contaminant migration routes from the surface into the subsurface or between aquifers; therefore, construction procedures and standards must be developed to reduce the potential for the introduction of contaminants into the subsurface or between aquifers.

2.0 Health and Safety Considerations

2.1 This section presents the generic hazards associated with monitoring well installation and is intended to provide general guidance in preparing site specific health and safety documents. Monitoring well installation may involve chemical hazards associated with materials in the soil or groundwater being investigated; and always involves physical hazards associated with drilling equipment and well construction methods. When wells are to be installed in the LHAAP facility a Health and Safety Plan (HASP) must be prepared to address the chemical and physical hazards associated with such work. The HASP must be reviewed and approved by the Health and Safety Officer before field work commences. This plan must also be reviewed by all field personnel and must be adhered to as field activities are performed

2.2 Health and safety hazards include but are not limited to the following:

- Slip, trips, and falls in tall grasses over obstacles, and muddy conditions. Review terrain hazards prior to conducting these operations. Ensure there is a safe means of access/egress to the sampling location.
- Dermal exposure to potentially contaminated water or soil. Ensure that proper personal protective equipment (PPE) is used to mitigate the impact of contact with contaminated material.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field personnel are properly trained in monitoring well installation and for verifying that monitoring wells are installed in accordance with this SOP. Some projects may have site specific sampling plan attachments (Work Plan) or a drilling subcontractor Statement of Work (SOW). In general, these documents will take precedence over the SOP.

3.3 Field Geologist

The field geologist is responsible for documenting that the drilling subcontractor complies with the procedures and equipment requirements contained in this SOP. The field geologist is responsible for recording all information relevant to the construction method and materials used in monitoring well installation. All phases of well construction and installation, with the exception of surface completions, require oversight by the field geologist. If a field geologist or other authorized AECOM representative is not present for the surface completion activities, the surface completions shall be inspected after installation to document that criteria set forth in this SOP or other project specific documents such as a Specific Field Sampling Plan or SOW are met. Any deviations from this SOP, or the Site Specific Work Plan, or the subcontractor's SOW require approval from either the technical lead or project manager. All deviations shall be documented in writing.

3.4 Field Team

All field team members assigned to perform these activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.5 Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, issuing nonconformances, etc.) if problems occur.

4.0 Definitions

Bentonite. Commonly sodium montmorillinite (a clay mineral), that is used as a sealing material due to its swelling capabilities when hydrated with water. Bentonite can be added to cement to create neat grout. Bentonite is typically found in granular forms such as powder, granules, pellets, or chips of various sizes.

Filter Pack. Generally sand (or coarser grained material) that is siliceous, uniform in size, clean, and, well rounded. It is placed in the annular space between the borehole wall and the well screen to prevent formation material from entering the well screen. The sand typically extends from the bottom of the screen interval to a minimum of 2-feet above the screened interval.

PID. Photoionization detector

FID. Flame ionization detector

Tag. Tag is a measurement below ground surface (bgs) to the top of the item being measured (e.g., tag the top of the sand pack).

Shallow monitoring well. A monitoring well with a screened interval in the shallowest groundwater-bearing zone of alluvial materials. Total depths for "shallow" wells have typically been approximately 15- to 50-feet bgs, and vary from site to site.

Intermediate monitoring well. A monitoring well with a screened interval in the groundwater-bearing zone of alluvial materials under the confining layer defining the bottom of the overlying "shallow" zone. Total depths for "intermediate" wells have been approximately 30- to 80-feet bgs, and vary from site to site).

Deep monitoring well. A monitoring well with a screened interval in the groundwater-bearing zone of alluvial materials immediately above the Wilcox formation. Total depths for "deep" wells have typically been approximately 80- to 100-feet bgs, and vary from site to site.

Wilcox monitoring well. A monitoring well with a screened interval in the Wilcox formation, which underlies surficial alluvial deposits at LHAAP. Depths to the Wilcox formation range from 60 feet to over 100 feet bgs, and vary from site to site. ,

5.0 Procedures, Equipment and Supplies

5.1 Required Records and Forms

5.1.1 HASP

5.1.2 Field Log Book

5.1.3 Boring Log

5.1.4 Well Construction Form

5.2 Recommended Materials, Equipment, or Supplies

5.2.1 Drilling Subcontractor Equipment

Potential equipment for monitoring well installation includes but is not limited to the following:

1. Drilling or augering equipment appropriate to site conditions, drilling depth, and other project requirements
2. Drill bits appropriate for the expected rock type(s) to be encountered

3. Sufficient threaded flush-joint riser pipe. Currently, Schedule 40 Polyvinyl Chloride (PVC) is the accepted riser material. (Note: no glues are permitted)
4. Sufficient threaded flush-joint continuous slot Schedule 40 PVC well screen. (Note: No glues are permitted). Prepack screens may be required at some locations. Well screens are typically of the slot size 0.010-inch (10 slot). The typical length is 10-feet; however, some wells may contain a longer screened interval, depending upon the purpose and location of the monitoring well.
5. Properly sized and washed filter pack material (typically, 20/40 silica sand or equivalent) with sufficient volume to meet the required well design criteria.
6. Bentonite or polymer-bentonite pellets, chips, or granules
7. Powdered bentonite
8. Portland cement, American Society for Testing and Materials Types I or II
9. Schedule 40 PVC surface casing (if needed)
10. Steel or aluminum protective casing with locking cap or flush mount junction boxes with manhole covers
11. Tremie pump/box and pipe
12. Grout baskets
13. Centralizers
14. Mud balance
15. Grout mixer and pump (may be combined with tremie equipment)
16. Assorted tools (e.g., wrenches, shovels, etc.)
17. Personal protective clothing, as required by the site specific HASP.
18. Stainless steel or surveyor's weighted tape to tag depths of installed well materials.
19. Decontamation equipment
20. Drums or appropriate containers for investigation-derived waste.

5.2.2 Field Geologist Equipment

- Straight edge or engineering ruler
- Calculator
- Munsell soil color charts
- Water level indicator
- Surveyor's measuring tape with weight for tagging depths of installed well materials
- Required health and safety equipment (e.g., PPE, monitoring equipment, cell phone or radio)

5.3 General Materials Requirement

Monitoring wells that are installed are typically constructed of the materials listed below. This list of materials is subject to modification, based upon project specific requirements and objectives.

Casing (riser) and sump: 2 or 4-inch diameter Schedule 40 PVC with threaded ends. Casing length is dependent upon the completion depth of the borehole and screened interval.

Well screen: 2 or 4-inch diameter Schedule 40 PVC with manufactured 0.010-inch (typically) slots, with threaded ends. Typical screen length is 10-feet, however the length may vary depending on the specific project objectives.

Surface casing: 8-inch inside diameter steel/Schedule 40 PVC casing to isolate upper water bearing zones (6-inch if a 2-inch well will be installed). The length of surface casing will depend upon depth to bedrock and project specific objectives.

Filter pack: Typically, 20/40 silica sand or equivalent.

Bentonite: 1/8-inch or 1/4-inch diameter pellets. Bentonite chips are not acceptable for annular seal material.

Grout: The grout mixture should consist of Type I/II Portland Cement, powdered bentonite, and potable water in the following proportions. For each 94-pound sack of Portland cement, add 3-5% (approximately 3 to 5-pounds) granular bentonite, and 6.5 to 7.8 gallons of potable water. Certain field conditions, such as highly solutioned or fractured bedrock, may require that accelerants, such as calcium chloride be added to reduce the grout curing time. If an accelerant is used in the completion of a well, the use of that material will be included both in the Well construction form and in the field log book.

Well caps: Expanding well caps.

Locks: Well locks will be installed.

Surface Completion: Either stickup completion with protective steel casing or flush mounted.

5.4 Specific Requirements for Monitoring Well Installation

All monitoring wells, remediation wells, injection wells, and piezometers shall be installed and completed as defined in the District Rules, Pineywoods Groundwater Conservation District, Revised January 13, 2011. These rules include all the requirements of 16 Texas Administrative Code §76.1000 (Technical Requirements – Location and Standards of Completion for Wells). A Texas Licensed Driller will be required to complete the installation of the wells and the well construction or abandonment forms for the Texas Water Development Board. The typical drilling method for monitoring wells is hollow stem augering, with wet rotary methods employed only when drilling conditions (flowing sands) preclude use of hollow stem techniques.

Specifications provided in this section are typical of well construction at LHAAP; however, total well depth, screen length, screen size and sand pack size will ultimately be decided by the lead geologist in consultation with the AECOM technical lead for the site, based on interpretations of observed lithography.

5.4.1 Installation of Shallow Monitoring Wells

The typical drilling method for shallow monitoring wells at LHAAP is hollow stem augering. The outside diameter of the augers should be at least 4-inches greater than the outside diameter of the well casing. The hollow portion of the augers must be large enough to allow the placement of the well casing through the augers down hole.

1. When the total depth (TD) of the borehole is reached, the borehole should be cleaned out to remove excess drill cuttings. Because the overburden materials are primarily fine-grained silts and clays, care should be taken to prevent sealing of the borehole

by excessive raising and lowering of the augers. Installation of the well should begin within 12-hours of reaching TD, except when if it is necessary to pull up the augers slightly to determine the static water level prior to setting a well. Record the borehole TD and the depth to water prior to installation of well material. Verify that the measured TD is desired completion depth. If the hole has partially collapsed or heaved, options for cleaning, redrilling, or installation in the open section of the borehole should be discussed with the task manager or technical lead.

2. In the event that the well completion depth is desired across an interval depth less than the total depth of the borehole, the well should be plugged to the base of the desired interval. Grout, bentonite pellets, or bentonite chips as specified by the Work Plan may be added to the bottom of the boring to raise the bottom of the hole to the desired depth. The grout should be pumped through a tremie pipe to the bottom of the borehole and filled from the bottom up to raise the bottom of the hole to the desired depth. During grouting, the tremie pipe should be submerged below the top of the grout column in the borehole to prevent free-fall and bridging. Well installations will not commence until the grout has cured, approximately 24-hours. Curing of the grout will be verified by a “hard tag”. Generally, an overnight curing period will be sufficient for an adequate cure. If bentonite is used, it should be added gradually to prevent bridging. Grout or bentonite addition will stop when its level has reached approximately 1-foot below the bottom of the desired string depth. A 1-foot layer of 20/40 silica sand should be placed immediately above the bentonite/grout plug prior to well installation and filter pack placement.

3. Verify the cleanliness of the well materials to be installed. If the materials are precleaned, wrapped in polyethylene bags, and documentation of precleaning is confirmed, then decontamination is not necessary. If the wrappings are not intact, and/or precleaning cannot be documented, then the well materials shall be decontaminated in accordance with SOP Attachment 9.

4. Determine if the surface completion of the well will be above ground or flush mount to calculate the quantity of well riser required. Assemble the well string (sump, screen, and riser) by screwing together the sections and tightening according the manufacturer’s instructions. No solvents or glues are to be used to assemble the sump, screen, and casing. All well materials shall be handled with clean latex or nitrile gloves or comparable substitutes. There should be a minimum of 6-inches and a maximum of 3-feet below the bottom of the borehole and the bottom of the well sump. Centralizers will be utilized for wells with depths exceeding 50-feet bgs. Centralizers shall be placed below the well screen, above the top of the bentonite seal, and every 30- to 50-feet thereafter. The field geologist shall record the location of all centralizers on the well construction diagram and the field notes.

5. Carefully lower the well string until it is at the desired depth. The well string should be suspended by the drill rig and should not rest on the bottom of the boring. In the event that the well string was dropped, lowered abruptly, or for any other reason is suspected of being damaged during placement, the string should be removed from the boring and inspected. In certain instances, the well string may rise after being placed in the borehole due to heaving sand. If this occurs, the driller must not place any drilling equipment (e.g., drill pipe, hammers, etc.) to prevent the well string from rising. The amount of rise should be noted by the rig geologist who should then consult the AECOM technical lead or project manager for an appropriate course of

action. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of any change in the SOP concerning an individual well. The field geologist shall document the start and finish time for installation of the well string, and depths of sump, well screen, and riser.

6. The filter pack will be installed by pouring the sand down hole between the well casing and auger, except where cavities or highly fractured intervals are encountered that preclude the placement of a filter pack. At highly fractured intervals and cavities, prepack screens should be used.

   The sand should be poured slowly to prevent bridging and moved around the annulus between the casing and augers to ensure an even distribution of the filter pack material in the annulus. As sand is placed in the annulus, the auger string should be slowly extracted to allow sand to fall below the auger and fill the space between the well and the borehole wall. This procedure should be repeated until the entire sand pack has been installed. The filter pack will extend from the bottom of the borehole to approximately 2-feet above the top of the screen unless otherwise specified in the drilling plan. The filter pack location shall not cross any confining layers. Periodic tagging of the filter pack during installation is recommended to prevent overfilling of the annulus. The field geologist shall document the quantity of filter pack used and compare the actual volume and calculated volume. Significant discrepancies between actual and calculated filter pack volumes should be explained as well as possible (e.g., loss of formation, borehole sloughing, etc.). Surging with a surge block may be used to compact the filter pack around the well screen. A minimum of 15-minutes between completion of the filter pack installation and initiation of the bentonite placement shall be observed to allow for settling of any filter pack through the water column. When installation of the filter pack is complete, both the drilling subcontractor and the field geologist shall tag and record the depth to the top of filter pack. Additional filter pack will be added as necessary until the necessary volume is emplaced. The field geologist shall document base of filter pack, top of filter pack, and the start and finish times for filter pack installation.

7. Bentonite pellets will be placed on top of the filter pack in the well annulus above the filter pack by pouring the bentonite pellets down hole between the well casing and auger. The bentonite should be added slowly and tamped to prevent bridging. A minimum of 2-feet and a maximum of 5-feet of bentonite will be placed in the annular space above the filter pack. If a prepack screen was utilized during well construction, a grout basket will then be used to support the bentonite above the cavernous interval. The field geologist shall document the quantity of bentonite used and compare the actual volume versus the calculated volume. Significant discrepancies between actual and calculated volumes should be explained as well as possible. Potable water shall be added to the borehole to hydrate bentonite emplaced above the water table. The manufacturer's instruction should be consulted to determine the optimal hydration time required. At a minimum, hydration time for the bentonite seal will be ½-hour. If approved by the field team leader or AECOM technical lead, bentonite slurry, such as Volclay grout, may be used for seals above the water table. The top of the bentonite seal shall be tagged and recorded by the drilling subcontractor and the field geologist after installation and after hydration. The field geologist shall document the base of the bentonite, top of bentonite, and start and finish times for bentonite placement.

8. After the bentonite seal has hydrated, the top of the seal should be tagged again to document the amount of swelling after hydration. The post-hydration measurement will be recorded on the well construction diagram as the top of the bentonite seal.
9. The grout will be mixed and pumped through a tremie pipe and filled from the top of the bentonite seal upward. The bottom of the tremie pipe should be maintained below the top of the grout to prevent free fall and bridging. Other alternative grouting methods may be necessary if karst or highly permeable conditions are encountered (i.e., grout baskets above a cavernous interval). The grout may be required to be placed in lifts of approximately 25-feet for deeper wells (>75-feet deep) and the wells that require a grout basket. The lifts of grout are to prevent compacting of the bentonite seal and filter pack and to lessen the loss of grout into the formation. Grout the well to within 2- to 3-feet of the ground surface. The field geologist shall document the quantity of grout added to the borehole and compare the volume utilized versus the calculated borehole volume. Significant discrepancies between the actual and calculated volumes should be explained as well as possible. The base of the grout seal, the top of the grout seal, and start and finish times for grouting shall be documented by the field geologist. After the grout is cured, the top of grout should be measured and recorded again to estimate slumping or loss to the formation.
10. A minimum grout cure time of 24-hours is required prior to above-ground and flush mounted surface completion activities.

5.4.2 Installation of Intermediate and Deep Monitoring Wells

Drilling the well boreholes for intermediate or deep monitoring wells will be conducted in two phases utilizing either hollow stem auger or mud rotary drilling techniques. The initial phase of drilling activities for each borehole will consist of drilling and installing surface casing within the first shallow water bearing zone.

For two inch wells installation isolating only one groundwater zone, the surface casing will consist of 6-inch diameter, schedule 40 PVC pipe extending at least 1-foot into the low permeability layer or aquitard. For four-inch well installations isolating only one groundwater zone, the surface casing will be 8-inches in diameter. For two-inch well installations isolating two groundwater zones, the outer surface casing will be 10 inches in diameter, with a 6-inch diameter inner surface casing. For four-inch wells, the outer surface casing will be 12 inches in diameter, with an 8-inch inner surface casing.

Once at the desired depth the surface casing will be grouted in place. After allowing the grout to set up for approximately 24-hours, the second phase of drilling the borehole will involve extending the soil boring by drilling beyond the surface casing to total depth. Upon reaching total depth, the borehole will be cleaned out to remove excess drill cuttings and to condition the hole.

Once the borehole has reached TD, and has been cleaned out, the following steps will be taken to install the monitoring well:

1. Installation of the monitoring well should begin within 12-hours of reaching TD. However, it is recommended that well installation begins immediately, or as soon as reasonably possible after the borehole is cleaned out to avoid collapse of unconsolidated materials in the overburden. The field geologist will verify and record the borehole TD and the depth to water prior to installation of well materials. If the hole has partially collapsed, options for cleaning, re-drilling, or well installation in the

open section of the borehole should be discussed with the technical lead or project manager.

2. In the event that the well completion depth is desired across an interval depth less than the total depth of the borehole, the bottom of the borehole should be raised by adding grout or bentonite to the bottom of the borehole. The addition of grout or bentonite will stop when its level has reached approximately 1-foot below the bottom of the desired well depth. A fine sand layer should be placed immediately above the grout or bentonite prior to the placement of the well screen and casing.

   Well installation will not commence until the grout has cured, approximately 24-hours, or if bentonite pellets are used, a ½-hour to allow the bentonite to hydrate.

3. Verify the cleanliness of the well materials. If the materials are pre-cleaned, wrapped in intact polyethylene bags, and documentation of pre-cleaning is confirmed, then decontamination is not necessary. If the wrappings are not intact, and/or pre-cleaning cannot be documented, then the well materials shall be decontaminated in accordance with SOP Attachment 9.

4. Determine if the surface completion of the well will be above ground or flush mount to calculate the quantity of well riser required. Assemble the well string (sump, screen, and riser) by screwing together the sections and tightening according the manufacturer's instructions. No solvents or glues are to be used to assemble the sump, screen, and casing. All well materials shall be handled with clean latex or nitrile gloves or comparable substitutes. The well sump at the bottom of the monitoring well should be a minimum of 6-inches and a maximum of 3-feet in length. Centralizers will be utilized for wells with depths exceeding 50-feet bgs. When possible the centralizers shall be placed below the well screen, above the top of the bentonite seal, and every 30- to 50-feet thereafter. The field geologist shall record the location of all centralizers on the well construction diagram and in the field notes.

5. Carefully lower the well string until it is at the desired depth. The well string should be suspended by the drill rig and should not rest on the bottom of the boring. In the event that the well string was dropped, lowered abruptly, or for any other reason is suspected of being damaged during placement, the string should be removed from the boring and inspected. In certain instances, the well string may rise after being placed in the borehole due to heaving sand. If this occurs, the driller must not place any drilling equipment (e.g., drill pipe, hammers, etc.) to prevent the well-string from rising. The amount of rise should be noted by the rig geologist who should then consult either the task manager, technical lead, or project manager for an appropriate course of action. The field geologist shall document the start and finish time for installation of the well string, and depths of sump, well screen, and riser.

6. The filter pack will be installed by pouring the sand down hole between the well casing and auger except where cavities or highly fractured intervals are encountered that preclude the placement of a filter pack. At highly fractured intervals and cavities prepack screens should be used.

   The sand should be poured slowly to prevent bridging and moved around the annulus between the casing and augers to ensure an even distribution of the filter pack material in the annulus. The filter pack will extend from the bottom of the borehole to approximately 2-feet above the top of the screen unless otherwise specified in the

drilling plan. The filter pack location shall not cross any confining layers. Periodic tagging of the filter pack during installation is recommended to prevent overfilling of the annulus. The field geologist shall document the quantity of filter pack used and compare the actual volume and calculated volume. Significant discrepancies between actual and calculated filter pack volumes should be explained as well as possible (e.g., loss of formation, borehole sloughing, etc.). Surging with a surge block may be used to compact the filter pack around the well screen. A minimum of 15-minutes between completion of the filter pack installation and initiation of the bentonite placement shall be observed to allow for settling of any filter pack through the water column. When installation of the filter pack is complete, both the drilling subcontractor and the field geologist shall tag and record the depth to the top of filter pack. Additional filter pack will be added as necessary until the necessary volume is emplaced. The field geologist shall document base of filter pack, top of filter pack, and the start and finish times for filter pack installation.

7. Bentonite pellets will be placed on top of the filter pack within the well annulus above the filter pack by pouring the bentonite pellets down hole between the well casing and auger. The bentonite should be added slowly and tamped to prevent bridging. A minimum of 2-feet and a maximum of 5-feet of bentonite will be placed in the annular space above the filter pack. If a prepack screen was utilized during well construction, a grout basket will then be used to support the bentonite above the cavernous interval. The field geologist shall document the quantity of bentonite used and compare the actual volume versus the calculated volume. Significant discrepancies between actual and calculated volumes should be explained as well as possible. Potable water shall be added to the borehole to hydrate bentonite emplaced above the water table. If approved by the project manager or technical lead, a bentonite slurry, such as Volclay grout, may be used for seals above the water table. The manufacturer's instruction should be consulted to determine the optimal hydration time required. At a minimum, hydration time for the bentonite seal will be ½-hour. If approved by the AECOM task manager or technical lead, a bentonite slurry, such as Volclay grout, may be used for seals above the water table. The top of the bentonite seal shall be tagged and recorded by the drilling subcontractor and the AECOM field geologist after installation and after hydration. The field geologist shall document the base of the bentonite, top of bentonite, and start and finish times for bentonite placement.

8. After the bentonite seal has hydrated, the top of the seal should be tagged again to document the amount of swelling after hydration. The post-hydration measurement will be recorded on the well construction diagram as the top of the bentonite seal.

9. The grout will be mixed as specified in SOP Attachment 11, and pumped through a tremie pipe with a side discharge port and filled from the top of the bentonite seal upward. The side discharge is required to prevent damage to the bentonite seal and/or the filter pack. The bottom of the tremie pipe should be maintained below the top of the grout to prevent free fall and bridging. Other alternative grouting methods may be necessary if karst or highly permeable conditions are encountered (i.e., grout baskets above a cavernous interval). The grout may be required to be placed in lifts of approximately 25-feet for deeper wells (>75-feet deep) and the wells that require a grout basket. The lifts of grout are to prevent compacting of the bentonite seal and filter pack and to lessen the loss of grout into the formation. Grout the well to within

2- to 3-feet of the ground surface. The field geologist shall document the quantity of grout added to the borehole and compare the actual volume versus the calculated volume. Significant discrepancies between the actual and calculated should be explained as well as possible. The base of the grout seal, the top of the grout seal, and start and finish times for grouting shall be documented by the field geologist. After the grout is cured, the top of grout should be measured and recorded again to estimate slumping or loss to the formation.

10. A minimum grout cure time of 24-hours is required prior to above ground and flush mounted surface completion activities.

5.4.3 Surface Completions

The majority of the surface completions for monitoring wells installed are above ground completions, however some monitoring wells are located in high traffic areas and will require flush mount completions. The purpose of the surface completions is to prevent downward migration of surface water or rainfall through the monitoring well annulus.

Any cutting of the PVC riser during surface completion or any other phase of monitoring well installation will be done with a pipe cutter or equivalent that ensures an even cut and prevents PVC shavings from entering the well. Hacksaws are not an acceptable alternative to pipe cutters.

5.4.3.1 Above Ground Surface Completions

Above ground surface completions consists of an expanding well cap, concrete pad, protective casing with locking cap and 4 guard posts.

Concrete pad: The concrete pad will be a minimum of a 4-foot square and 4-inches thick. The pad will be constructed so that it slopes away from the wellhead. If applicable, the freshly poured concrete should be protected from rain by covering with plastic until the concrete is cured. If forms are used, they are to be removed after the concrete has cured.

Protective Casing: The PVC well riser will be surrounded by aluminum (preferred) or steel protective casing with a locking cap. The protective casing will be 5-feet in length with a diameter larger than the riser pipe. An internal mortar collar will be placed within the protective casing and outside the PVC well casing to a height of approximately 6-inches above the ground surface inside the protective casing. The protective casing will be installed to a depth of approximately 2 ½-feet bgs. The monitoring well identification will be stenciled in black on the protective casing. Additionally, a brass plate containing the well number and horizontal and vertical coordinates will be attached to the protective casing with screws. The PVC riser may have to be cut to accommodate the expansion well cap and locked inside the protective casing.

Guard posts: Four 4-inch diameter, 5-foot long or similar steel guard posts will be installed on each corner of the concrete pad. The posts will be installed outside the concrete pad, but no more than 12 inches from the pad. Posts will be set in concrete with approximately 2-feet below ground surface. The posts will be filled with concrete and painted yellow.

5.4.3.2 Flush Mount Well Completion

Flush mount well completions will be necessary at locations where an aboveground well completion would interfere with facility operations. Flush mount completions consist of an expanding well cap, concrete pad, below ground traffic box or equivalent and an 8- or 12-inch steel, flush mount, bolt-down traffic bearing cover.

Concrete pad: The concrete pad will be a minimum of 4-foot square and 4-inches thick. Approximately half of the pad thickness will be below land surface. If the pad is located in a roadway or parking lot, the edge of the pad shall be even with the existing concrete or asphalt surface to prevent vehicle damage. The pad will be constructed so that it slopes away from the wellhead. If applicable, the freshly poured concrete should be protected from rain by covering with plastic until the concrete is cured. If forms are used, they are to be removed after the concrete has cured. The well identification number will be written into the concrete pad prior to it curing.

Traffic box and manhole cover: The traffic box should be installed slightly above grade. The concrete pad will be flush with the top of the traffic box and slope to grade to promote surface drainage away from the well. The manhole cover shall be equipped with a gasket to prevent leakage if rainwater or surface water into the traffic box. The PVC riser may have to be cut to accommodate the expansion well cap and lock.

5.5 Special Considerations

- Perched Water. Where present, screen lengths and well construction should be adjusted to insure the screened interval (including the filter pack) does not span or include both the perched water and water table in the overburden. Conversely, if a perched interval is the desired monitoring objective, wells should be drilled and installed with a short 5-foot screen across the perched zone only, with the base of the well and screen set no deeper than the underlying perched horizon (i.e., does not allow for migration below perched aquifer).
- Light Nonaqueous Phase Liquid (LNAPL) (free product) considerations. Where LNAPL is expected, screen interval lengths should be adjusted or constructed so as to straddle the water table (free product will not be detectable in a well screened below the water table horizon).
- Dense Nonaqueous Phase Liquid (DNAPL) considerations. Where DNAPL is expected, wells should be constructed as fully-penetrating, with termination in the underlying confining layer.
- Flowing Sands. Where drilling conditions preclude use of hollow stem auger techniques, wet rotary methods will be employed. Wet rotary methods will be first attempted using only the water and fines native to the borehole. If the “mud” created from formation water and fines is insufficient to maintain the borehole, the minimum amount of bentonite necessary to maintain borehole integrity will be added to the natural mud. At no time will organic additives be utilized; only bentonite will be added to fluids circulating in the borehole.

5.6 Records

At a minimum, the field geologist for well installation shall document the following information: The information is to be recorded in the field log book, field form, and well construction diagrams. The start

and finish times for each phase of the well installation process shall be recorded. The following additional relevant information may be recorded at the field geologist's discretion:

- Total depth of borehole (feet bgs)
- Diameter of borehole (inches)
- Length, diameter, and material of surface casing
- Depth surface casing installed to (feet bgs)
- Location, diameter, and depth of any centralizers
- Quantity of grout used to cement surface casing: type of grout, number of sacks, sack weight, type and quantity of any additives used (e.g., used 12- to 50-pound sacks of Lonestar type I Portland cement mixed with approximately 25-pounds of Wyo-Ben powdered bentonite)
- Material, length, diameter, and slot size of the well screen
- Installation depth of well screen (feet bgs)
- Length, diameter, and material of casing
- Installation depth of casing (feet bgs)
- Casing stickup (if applicable)
- Quantity of filter pack (include manufacturer's name, sand size, number of sacks used, and sack weight)
- Tagged depth of filter pack (feet bgs)
- Quantity of bentonite used (include manufacturer name, diameter if pellets used, number of buckets, and weight of bucket)
- Tagged depth of bentonite (feet bgs) (before and after hydration)
- Quantity of grout used to cement well casing (include manufacturer name, # of sack, sack weight, type and quantity of any additives used)
- Tagged depth of grout after installation and after curing (if multiple lifts are performed, record data for each lift)
- Surface completion information

Any deviations from this SOP or the site specific Work Plan will require approval from one of the following personnel: the technical lead or the project manager. All deviations shall be documented in writing.

6.0 Exception Provisions

None.

7.0 Cross Reference

American Standard of Testing and Materials (ASTM), Standard Practice for Design and Installation of Ground Water Monitoring Wells in Aquifers, ASTM Designation D 5092 - 90, published October 1990, (reapproved 1995).

ASTM, Standard Guide for Design of Ground-Water Monitoring Systems in Karst and fractured-Rock Aquifers, ASTM Designation D 5717-95, published June 1995

U.S. Army Corps of Engineers, Engineering and Design Monitoring Well Design, Installation, and Documentation, at Hazardous Toxic, and Radioactive Waste Sites, EM 1110-1-4000, November 1998.

Driscoll, F. G., Groundwater and Wells, Second Edition, St. Paul, Minnesota, Johnson Division, 1986.

Hazardous Waste Remedial Action Program, Standard Operating Procedures for Site Characterization, DOE/HWP-1OO, July 1990.

Pineywoods Groundwater Conservation District, District Rules, Revised January 13, 2011. www.pgcd.org/pdfs2/rules.pdf\

Texas Administrative Code (TAC), Title 16 Chapter 76 Rule 76.100, Technical Requirements – Locations and Standards for Completion of Wells, adopted to be effective March 1, 2013.

Texas Administrative Code (TAC), Title 30 Chapter 330 Rule 330.421, Monitor Well Construction Specifications, adopted to be effective March 27, 2006.

U.S. Environmental Protection Agency (USEPA), Manual of Water Well Construction Practices, EPA/570/9-754), 1975.

USEPA, Procedure Manual for Ground Water Monitoring at Solid Waste Disposal Facilities, SW-611, December 1980.

USEPA, Resource Conservation and Recovery Act (RCRA) Ground-Water Monitoring Technical Enforcement Guidance Document, EPA/PB87-107751, 1986

USEPA, A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001, 1987.

USEPA, (Region 4) Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, May 1996.

8.0 Tables

None.

9.0 Attachments

A – Field Facts

B – Well Completion Form

10.0 Revision History

Revision	Date	Changes
0	June 2011	Shaw, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Attachment A – Field Facts

Volume of Schedule 40 PVC Pipe				
Diameter (inches)	**O.D. (inches)**	**I.D. (inches)**	**Volume (gal/linear ft.)**	**Weight of Water (lbs/linear ft.)**
1¼	1.660	1.380	0.08	0.64
2	2.375	2.067	0.17	1.45
3	3.500	3.068	0.38	3.20
4	4.500	4.026	0.56	5.51
6	6.625	6.065	1.5	12.5
8	8.625	7.981	2.6	21.65
12	12.750	11.938	5.81	48.44

Hole Diameter	**Volume/Linear Ft. of Hole**		**Nominal Casing Diameter**	**Volume/Linear Ft. of Annulus**		**Pounds Sand/ Linear Ft. of Annulus**	**Pounds ½" Pellets per Linear Ft. of Annulus**
	Gal.	**Cu. Ft.**		**Gal.**	**Cu. Ft.**		
7¼"	2.14	0.29	1¼"	2.03	0.27	27	21
7¼"	2.14	0.29	2"	1.91	0.26	26	20
7¾"	2.45	0.33	2"	2.22	0.30	30	23
8¼"	2.78	0.37	2"	2.55	0.34	34	26
10¼"	4.29	0.57	2"	4.05	0.54	54	41
8¼"	2.78	0.37	3"	2.28	0.30	30	23
10¼"	4.29	0.57	3"	3.79	0.51	51	38
12¼"	6.13	0.82	3"	5.62	0.75	75	57
8¼"	2.78	0.37	4"	1.95	0.26	26	20
10¼"	4.29	0.57	4"	3.46	0.46	46	35
12¼"	5.13	0.82	4"	5.30	0.71	71	54
12¼"	6.13	0.82	6"	4.33	0.58	58	44

Miscellaneous Data:

1 Cu. Ft. = 7.5 gal. (approx.)
1 Gallon = 0.134 Cu. Ft. (approx.)
1 Cu. Yd. = 202 gal. (approx.)
1 Gallon = 0.005 Cu. Yd. (approx.)
1 Gallon of Water = 8.34 lbs. (approx.)
1 Cu. Ft. of Fresh Water – 62.4 lbs. (approx.)

PSI = 0.434 x the height of the water column in feet
Feet of Head = PSI x 2.304
1 Barrel = 42 gallons (approx.)
1 Sack of Sand = 1 Cu Ft. and approx. 100 lbs.
1 Sack of Cement = 1 Cu. Ft. and approx. 96 lbs.
1 Pail of Bentonite Pellets = 50 lbs. (approx.)

WELL COMPLETION FORM

FIELD REPRESENTATIVE: _____

DRILLING CONTRACTOR: _____

DRILLING TECHNIQUE: _____

AUGER SIZE AND TYPE: _____

BOREHOLE IDENTIFICATION: _____

BOREHOLE DIAMETER: _____

WELL IDENTIFICATION: _____

WELL CONSTRUCTION START DATE: _____

WELL CONSTRUCTION COMPLETE DATE: _____

SCREEN MATERIAL: _____

SCREEN DIAMETER: _____

STRATUM-SCREENED INTERVAL (FT): _____

CASING MATERIAL: _____

CASING DIAMETER: _____

TYPE OF FILTER PACK: _____
GRADIATION: _____

AMOUNT OF FILTER PACK USED: _____

TYPE OF BENTONITE: _____

AMOUNT OF BENTONITE USED: _____

TYPE OF CEMENT: _____

AMOUNT CEMENT USED: _____

GROUT MATERIALS USED: _____

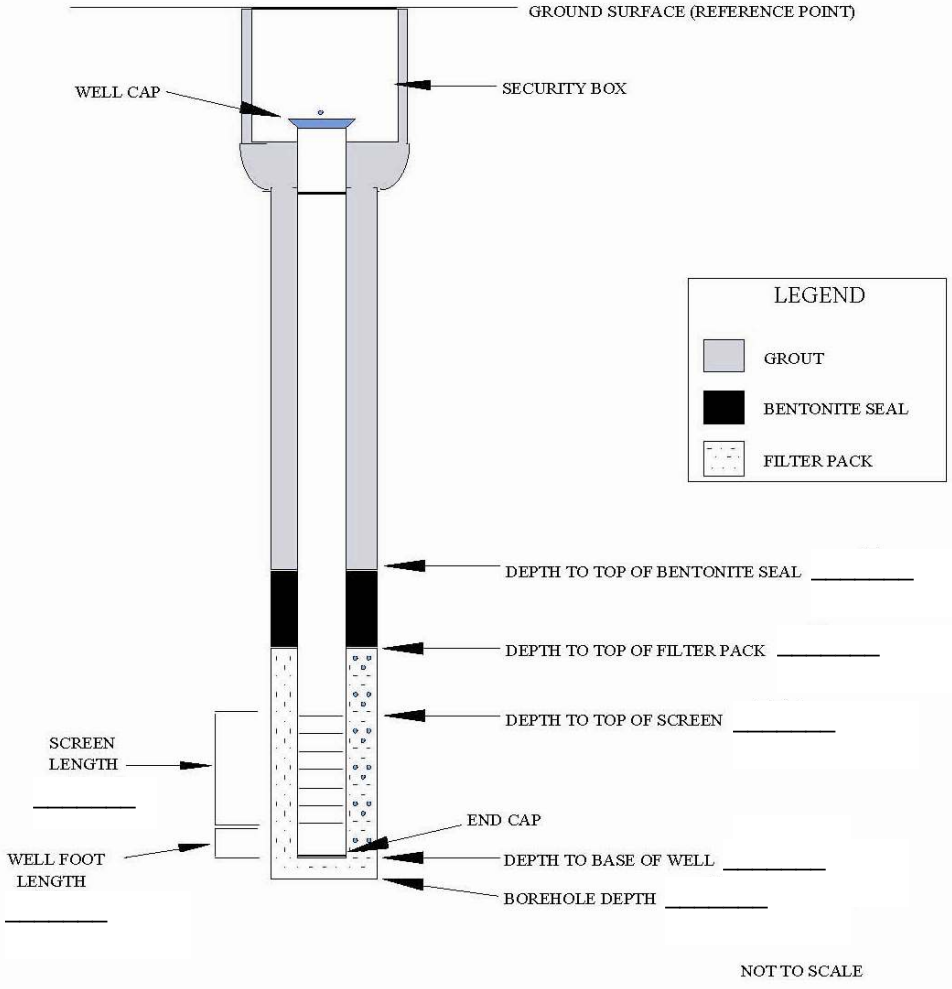
DIMENSIONS OF SECURITY BOX: _____

TYPE OF WELL CAP: _____

TYPE OF END CAP: _____

COMMENTS:

SPECIAL CONDITIONS
(describe and draw)



INSTALLED BY: _____ INSTALLATION OBSERVED BY: _____

DISCREPANCIES: _____

Standard Operating Procedure

Combined Cone Penetrometer Testing (CPT) and Membrane Interface Probe (MIP) Investigations

Attachment: 13

Revision No.: 2

Revision Date: June 2014

Standard Operating Project Procedure

Procedures for Cone Penetrometer Testing (CPT) and Membrane Interface Probe (MIP) Investigations

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Standard Operating Project Procedure

Procedures for Cone Penetrometer Testing (CPT) and Membrane Interface Probe (MIP) Investigations

1.0 Scope and Applicability

1.1 The purpose of this Standard Operating Procedure (SOP) is to define the requirements for using combined CPT/MIP equipment for subsurface investigations at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions. The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP Technical Lead or the AECOM LHAAP Project Manager (PM) before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

1.2 Direct sensing boring investigations are conducted to delineate or screen contaminants and soil types at high resolution, with minimal generation of waste, in a more rapid fashion than traditional drilling methods. Direct sensing tools for delineating or screening contaminants include, but are not limited to, MIP, Laser Induced Fluorescence including Ultraviolet Optical Screening Tool, Tar Green Optical Screening Tool, and Rapid Optical Screening Tool. Direct sensing tools for identifying soil types include Electrical Conductivity Probe, Cone Penetrometer Tool, and Hydrualic Profiling Tool. Many of the same practices used to conduct traditional direct-push borings are used to conduct direct sensing borings. Direct-sensing methods are limited to soils and unconsolidated materials that can be penetrated with specified equipment. In general, sampling is performed by advancing rods carrying a direct sensing tooling into soil by means of a 'direct-push' method. The ability to penetrate a soil and attain a specific depth is contingent upon several factors, including hammer energy, rig weight, compactness and density of soil, consistency of soil, and tooling. In general, direct-push methods are not effective for 1) solid rock, 2) weathered rock, 3) dense, cemented or coarse soils, or 4) certain cohesive soils (water can impart friction on tooling which can also lead to refusal).

1.3 Insertion methods are varied with direct-push rigs and include static hydraulic push, impact percussion, and combination/hybrid rigs.

1.4 Tooling typically consists of hollow rods, which carry data lines to a direct sensing interface near the base of the drill tooling. Familiarity with the rig specifications and tooling and site setting is essential prior to safely and effectively implementing direct-push investigations.

This SOP addresses the oversight and direction of direct sensing direct-push rigs for evaluating contaminants and soil types.

2.0 Health and Safety Considerations

2.1 The CPT/MIP work may involve chemical hazards associated with materials in the soil or groundwater being investigated; and always involves physical hazards associated with the advancement of ground penetrating equipment and soil screening methods. When site investigations are being conducted in locations where the aquifer and/or overlying materials may contain chemical hazards, a Health and Safety Plan (HASP) must be prepared and approved by the Health and Safety Officer before field

work commences. This plan must be distributed to all field personnel and must be adhered to as field activities are performed.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that all activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.3 Field Geologist

The field geologist is responsible for documenting that the subcontractor complies with the procedures and equipment requirements contained in this SOP. The geologist is responsible for recording all information relevant to the site investigations and equipment used for the work contained in this SOP. Any deviations from this SOP, or the site specific work plan, or the subcontractor's Statement of Work (SOW) require approval from either the technical lead or PM. All deviations shall be documented in writing.

3.4 Field Team

All field team members assigned to perform these activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.5 Site Contractor Quality Control Systems Manager (CQCSM)

The Site CQCSM is responsible for ensuring that this procedure is correctly implemented and that data collected meets the requirements of the contract.

4.0 Required Documents

- HASP/Environmental Health & Safety SOPs Manual
- Level D equipment or PPE upgrades as dictated by site conditions and HASP
- Procurement Documentation/SOW/Cost Breakdown
- Texas 811 or Utility Clearance Number
- Signed Access Agreement (if applicable or off-site work is performed)

5.0 MIP Investigation

5.1 MIP Description

MIP is a continuous volatile organic compound (VOC) sampling system that heats the soil, water, and vapor matrix as it is driven into the subsurface. The VOC mass present in the subsurface is extracted across a permeable membrane and carried to the surface by an inert purge gas via small diameter inert tubing. At the surface, the VOC mass is passed across a chemical detector suite to provide a correlation between contaminant detection and the depth of the probe at the point of detection.

5.2 Confirmation Sampling

The MIP results by themselves provide response curves only and are considered semi-quantitative. To establish an order of magnitude correlation to actual concentrations, traditional soil and groundwater sampling can be performed at locations and depths that represent low, medium, and high concentrations based on MIP results. The number and locations of confirmation samples are dependent on the distribution of the target analytes in the subsurface and the varying down-hole conditions.

6.0 CPT Investigation

6.1 CPT is a method of providing real-time data for use in characterizing the subsurface, as opposed to older methods of analyzing subsurface conditions in the laboratory. It consists of a steel cone that is hydraulically pushed into the ground at up to 40,000 pounds of pressure. Sensors on the tip of the cone collect data. Standard cone penetrometers collect information to classify soil type by using sensors that measure cone-tip pressure and friction. CPT is often used in conjunction with HydroPunch tests to obtain groundwater samples for analyses. To confirm the CPT results core samples may be taken adjacent to the CPT boreholes to visibly observe and correlate the subsurface soils with the CPT responses.

7.0 Procedures

7.1 In many instances site conditions will require deviation of SOW or work plan. It is important that field staff and the PM communicate unique site conditions (e.g., stratigraphy, presence of water, presence of contaminants, etc.) that could potentially affect drilling SOW. Communications are to be documented in the field log book.

7.2 Prior to performing direct-push rig oversight, review equipment and tooling specifications, SOW, project work plan and HASP with the AECOM PM or AECOM Technical Lead, on-site AECOM personnel and subcontractors (if present).

7.3 Confirm that utilities are identified and clearly marked in the field. Documentation of utility clearance will be kept in the project files and submitted to the USACE PM/Technical Manager (TM) upon request.

7.4 Direct-push rigs are potentially dangerous due to stored energy (e.g., hydraulic cylinders and overhead masts) and /mechanized parts. CPT rigs are not typically equipped with emergency power shut-off "kill switches". If the rig does not have a kill switch, locate the equipment ignition key/switch. Share the location of either kill switch or ignition key/switch with all onsite personnel. Proceed with drill rig inspection. Proceed with tail-gate safety meeting and HASP overview, with all site personnel reading and signing HASP.

7.5 Document site activity in a field note book dedicated to the project. Soil descriptions will be described in the soil boring logs. Tablet computers or other portable electronic devices may be used to store lithological data/observations.

7.6 Proceed with drilling and soil collection.

7.7 Take and document photographs if required for the project.

7.8 Document/Log the following:

- Personnel present
- Dates, time, weather conditions
- Drill contractor and drillers' names
- Drill rig make and model
- Drill Tooling (e.g., rods, augers, dimensions, hammer weights, etc.)
- Downtime
- Boring ID, start and stop times
- Linear Footage Drilled (not sampling method)
- Any comments from driller regarding penetration resistance
- Any damage to landscaping, pavement or other site features
- Installation of shallow monitoring wells

7.9 It is not practicable to decontaminate the rods associated with the CPT rig as described in the equipment decontamination SOP #9 due to the cable running through the rods. Therefore, decontamination consists of pulling the rods through a rubber washer while pulling the rods out of the borehole and into the drill rig. The rubber washer works as a squeegee removing soil and water from the rod. The MIP, attached to the rod can be cleaned by spraying detergent solution followed with a deionized water rinse. Caution should be exercised while cleaning the MIP as it generates heat up to 250 degrees Fahrenheit. If soil samples are taken with the CPT direct push rig, the split spoon sampler from this sampling process will require separate decontamination from the rest of the direct push drill string.

8.0 Selection of Boring Locations

Direct sensing tools are unique in their real time response and reporting of subsurface conditions. This offers the ability to implement a dynamic SOW in which boring locations can be shifted, added, removed, and

lengthened. There are many implications of this, the first of which is utility clearance and access. Prior to entering the field the most up to date version of the conceptual site model should be reviewed and any area of suspected contamination to be investigated should be cleared for utilities as well as some margin around that area to allow for step out borings. In some cases access restrictions and preclearance requirements do not allow for this.

At LHAAP, CPT boring locations are typically determined through analysis of previously collected data and will be directed by a work plan. AECOM will attempt to coordinate with USACE before any borehole location is moved greater than 50 feet from the originally-specified location or is moved for reasons other than inability to access the original location.

In cases where previous data does not exist or is insufficient to select boring locations, investigations should generally be performed on a grid spaced coarsely across the investigation area. Based on the observations from the borings performed on the coarse grid additional borings can then be focused to meet project goals.

Generally the following is a list of considerations that should be made when performing direct sensing investigations:

1. Include locations over a sufficient area to verify the lateral extent of light non-aqueous phase liquids (LNAPL) distribution, if detected.

2. Where possible, approximate an x-y grid pattern on as small a spacing as practical to provide improved resolution of the likely heterogeneous contaminant distribution.

3. Include locations immediately adjacent to representative existing monitoring wells and borings with varying degrees of observed impacts (e.g., wells with: LNAPL, high and low LNAPL transmissivity, high dissolved phase concentration, low dissolved phase concentration, no observed impacts). These borings should be located as close to the existing monitoring wells or boreholes as possible (normally less than eight feet) without compromising or damaging the monitoring well. The data from these direct sensing borings are used in calibrating/correlating the direct sensing data to historical boring data collected.

4. Include clean locations to demonstrate complete lateral delineation and to evaluate background effects. If possible, provide a clean soil/clean groundwater and clean soil/impacted groundwater location to help differentiate the direct sensing response to dissolved-phase constituents.

5. Include locations in potential migration pathways.

An additional recommended option is to have technical staff interpreting data in near real time (e.g., at the end of each day) by incorporating it into the existing conceptual model. This can be done on markups of aerial and cross section figures or through integrated 3D conceptual modeling visualizations. Based on these interpretations, technical staff can recommend changes to the dynamic work plan in terms of boring placement, priority, and depth during the same mobilization. This typically results in the acquisition of a complete picture of the conceptual site model minimizing future mobilizations.

9.0 Exception Provisions

None.

10.0 Cross Reference

D6282-98 Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations.

Technology-specific information can be found with direct sensing equipment manufactures and operators.

11.0 Revision History

Revision	Date	Changes
0	26 March 2013	AECOM, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Underground Utility Clearance

Attachment 14

Revision No.: 1

Revision Date: June 2014

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1.0 Scope and Applicability

1.1 The purpose of this Standard Operating Procedure (SOP) is to describe the proper methods for ensuring that underground utilities are identified properly before excavation work commences at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP Project Manager (PM) before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

2.0 Health and Safety Considerations

2.1 A Health and Safety Plan (HASP) must be prepared and approved by the Health and Safety Officer before field work commences. This plan must be distributed to all field personnel and must be adhered to as field activities are performed.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that all activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.3 Field Team

All field team members assigned to the project are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Site Manager or Task Manager.

3.4 Site Contractor Quality Control Systems manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, issuing non conformances, etc.) if problems occur.

4.0 Definitions

Underground Utilities: All utility systems located beneath grade level, including, but not limited to: gas, electrical, water, compressed air, sewage, signaling and communications, etc.

Ground Disturbance: Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.

5.0 Procedures

5.1 Ground disturbance may be a conducted for a variety of purposes, including, but not limited to, exposing existing buried lines, soil sampling, remedial excavations, or installing monitoring wells or test pits.

5.2 Improper ground disturbance may impact a buried pipeline or utility line and cause a major release of a hazardous substance, flood, or electrocution. Serious injuries and significant property damage have resulted from insufficient/inadequate identification of underground installations during the course of ground disturbance work.

5.3 To control hazards associated with coming in contact with such installations, the American Public Works Association's guidelines for the uniform identification of underground installations has been adopted.

5.4 The Project Manager is responsible for ensuring that all work, including the identification, location, and access to all underground utilities, is planned and performed in accordance with contract specifications and safety requirements.

5.5 The planning for associated work and avoiding underground utilities shall be part of the project safety planning in the Health and Safety Plan (HASP).

5.6 The Field Team Leader or Project Manager is responsible for the execution of work in accordance with this and other associated AECOM SOPs, including:

- The review of the HASP.
- Verification that all steps have been taken to identify existing underground utilities in the area to be disturbed.

6.0 Underground Utilities

6.1 To avoid injury from utilities on site, utility lines shall be located and marked prior to conducting any drilling or digging on site. If available, refer to site drawings, as-built drawings, or client interviews for information pertaining to utilities on site.

6.2 Types of underground lines:

- Natural Gas line
- Petroleum line

- Potable water line
- Raw water line
- Sewer line
- Power line
- Cable television/communication line
- Cathodic protection line
- Grounding cable
- Process piping/flow line

6.3 Prior to conducting the ground disturbance, locate all pipelines and utilities that pass within a 30-foot radius (9.1 meters [m]) of the work area. Whenever feasible, out-of-use utilities still present in the subsurface will be located. To clear the work area, conduct the following:

- Notify all pipeline and utility companies, and confirm that their notification requirements are fulfilled prior to conducting ground disturbance.
- Identify pipelines, power lines, utilities, and irrigation canals in a 30-foot (9.1 m) zone of the work area with the owner of the utility.
- Get approval for work within a right-of-way (ROW) or within 15 feet (4.6 m) of a line if there is no ROW.
- Prepare a site map identifying the search area, the ground disturbance area, and known underground utilities, when practical.
- Confirm that all pipelines, power lines, and utilities are marked.

    1. Consult with on-site personnel with extensive knowledge and experience when searching for indications of underground utilities.
    2. At locations where personnel or site recon identifies the potential for underground utilities:

        a) First, determine if the location can be repositioned away from suspected underground utility.

        b) If location cannot be repositioned away from suspected utility or if the location of underground utility is not known well enough to reposition, follow steps below:

            I. If SHALLOW utilities are expected, hand-auger to 5-feet or 10-feet if there is reason to suspect underground utilities may be deeper than 5 feet.

            II. If DEEP utilities are expected, a geophysical survey or air-knife operation shall be performed to mitigate suspected risk of hitting deeper utilities.

6.4 Look for pipeline indicators:

- Look for warning signs where pipelines cross roads or water courses.
- Look for cut lines, wells, tanks, or valves that may indicate the presence of pipelines.

- Look for ground settling from previous work.
- Talk to nearby landowners and residents.
- Look for vegetation appearing "different" from the surrounding vegetation (e.g., greener, taller, shorter, or more brown than surrounding vegetation).

6.5 When you are working within a pipeline ROW, you shall get written approval from the pipeline owner prior to doing your work.

6.6 Call the pipeline owner at least two full working days before you dig so the pipeline can be located and marked.

6.7 Before digging within 3 feet of a pipeline with machinery, contact the pipeline owner to determine if the pipeline can be exposed by hand or hydrovac. No machinery may come within two feet of the pipeline. Exposure of the pipeline should be done with the supervision of the owner or their representative. Coordinate with the pipeline owner for any activities to recover an exposed pipeline.

6.8 During ground disturbance:

- Before conducting excavation activities within 3 feet of a utility marking, those underground utilities shall be exposed by hand or hydrovac. Coordinate with the utility owner for any activities to expose or recover exposed utilities.
- Make arrangements for supervision from a vantage point that can easily observe the excavation during hand exposure of the utility.
- If for any reason these hand excavations are temporarily filled in, mark them.
- Make arrangements for supervision from a vantage point that can easily observe the excavation during any mechanical excavation within 3 feet of an underground utility.
- Make arrangements for supervision ("a Signal Person") during backfilling of utilities.
- Cutting back and shoring of excavations shall be completed as per the requirements defined in the Corps of Engineers Safety Manual, EM 385-1-1 to ensure that there are no cave-ins.
- Do not damage utilities when exposing the utility by hand (shovel). Picks should not be used when trying to expose a utility line.
- Remember that all workers have the right and responsibility to refuse to carry out any work or procedures that they feel are unsafe.
- Review the site-specific emergency response plan.

6.9 Identification of Installations

6.9.1 Various forms of underground utility lines or pipes may be encountered during deployments to field sites. Damaged utilities, in particular, can present other hazards including asbestos, explosion, electric shock, scalding, etc., and they shall be avoided. The presence of damaged utilities at any work location shall be immediately brought to the attention of the field Field Team Leader or another member of the site management team.

6.9.2 Guidance will be provided on the appropriate action to be taken, which could include suspension of work until the responsible utility agency is contacted and the hazard is isolated or eliminated.

6.9.3 Extreme caution should be exercised when attempting to locate underground utilities. The location of utilities may not be consistent with the as-built drawings or maps, as indicated by the placement of surface signage, or as described by personnel. The following list describes coordination and planning of the job that shall be required with the client or owner:

- Prior to digging and drilling operations, the client shall always be informed of the potential location(s) of underground utility systems.
- If a utility permit is required from the client or owner, it shall be secured.
- The client shall explain how the utility line may be identified (e.g., red concrete encasement).
- All underground installations shall be considered “live” and “operational” until the owner, client, or utility authority isolates any hazardous energy or deactivates the system and can demonstrate that condition.
- Where line placement and depth is known or suspected, and where there is potential for contact, hand digging, hand augering or similar methods shall be used.

6.9.4 The One Call System Definition and Directory or its equivalent shall be used to prepare for excavation work in the event the identity of an underground installation(s) is unknown.

6.9.5 Line location documentation (or appropriate regional agency or company) provides a listing of companies that have registered buried facilities in the proposed work area. Some public utilities and private companies are not members of the One Call System. In order to give line operators sufficient time to respond to a request to locate, a minimum waiting period of 48 business hours is required prior to beginning work.

6.9.6 Once the underground installation has been identified, proper surface markings shall be made in accordance with the guidelines contained in this SOP or as contract-specified.

6.10 Uniform Color-Coding

6.11 The colors and corresponding installation type are as follows unless otherwise contract-specified:

- Red: Electric Power Lines, Cables, Conduit, and Lighting Cables
- Yellow : Gas, Oil, Stream, Petroleum, or Gaseous Materials
- Orange : Communication, Alarm or Signal Lines, Cables, or Conduit
- Green: Sewers and Drain Lines
- White : Proposed Ground Disturbance area
- Pink: Temporary Survey Markings
- Purple: Non-potable Water

7.0 Records

The following records on the identification of and response to underground utilities will be maintained in the project files and submitted to the Corps of Engineers PM/technical manager upon request:

- All information regarding the identification of underground installations (this information can also be transferred to the appropriate drawings and/or prints and shall be available on site).
- Drawings and/or prints shall be maintained for the life of this project.
- Identifying Underground Installations Checklist.

8.0 Exception Provisions

None.

9.0 References

American Public Works Association, *Excavator's Damage Prevention Guide and One-Call Systems International Directory*, 2002.

10.0 Tables

None

11.0 Attachments

Underground Installations Checklist

12.0 Revision History

Revision	Date	Changes
0	12 June 2013	AECOM Initial Version
1	June 2014	AECOM Revision

13.0 Identifying Underground Installations Checklist

Name of Contractor:

Location: Project #:

Type of Ground Disturbance Planned:

Date: Time:

Weather:

Person Conducting Inspection: Title:

Responsibilities of the Ground Disturbance Contractor

Supply as much pertinent information as possible when calling in location (house #, pole #, facility #, landmark to measure distance, nearest intersection, etc.)

	Completed	N/A
Notify the One Call Center 2 business days in advance but no more than 10 days prior to activities.		
Hand expose or hydrovac within 3 feet (60cm) of a mark out or within the distance required by the owner of the utility before operating any mechanized equipment.		
Mark and identify perimeter of proposed site of excavation or boring locations in white.		
Protect and preserve markings, staking, or other designations until no longer necessary for safe excavation.		
Obtain new ticket every 14 business days.		
Check surrounding area before initiating ground disturbance.		
Recordkeeping		
Confirmation number received.		
Copy of mark-out ticket readily available.		
Site Map documenting ground disturbance area and identified utilities completed.		
Records have been maintained to document any damage.		

Comments:

Standard Operating Procedure

Field Calibration Checks

Multiparameter Water Quality Meter

Attachment 15

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Field Calibration Checks
Multiparameter Water Quality Meter

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Standard Operating Procedure

Field Calibration Checks
Multiparameter Water Quality Meter

1.0 Scope and Applicability

1.1 The purpose of this standard operating procedure (SOP) is to provide instruction on conducting field calibration checks for the Horiba U-50 Series Multiparameter Water Quality Meters used to measure water quality parameters for ground water and surface water at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions

1.2 The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by one of the following: the LHAAP technical lead or the LHAAP Project Manager (PM) before implementation. For the purposes of this SOP, water quality parameters include temperature, pH, dissolved oxygen (DO), conductivity (COND)/specific conductance, oxidation reduction potential (ORP), and turbidity.

1.3 To obtain correct measurement values, sensors need to be calibrated or have calibration checked using standard solutions before measurement. The Horiba U-50 Series supports simultaneous auto calibration of the pH, electrical conductivity and turbidity sensors in pH 4.01 standard solution and DO and depth sensors simultaneously in air, of individual measurement parameters. An oxidation reduction potential (ORP) calibration check is performed separately with a 229 mV ORP standard solution. In the event that proper calibration cannot be achieved in the field, the meter may be sent back to the factory for repair or individual sensors may be replaced per the instructions provided in the equipment operating manual.

1.4 This SOP is written specifically for the Horiba U-50 Series Multiparameter Water Quality Meter. The manufacturer's Instruction Manual can be consulted for additional information on calibration requirements and procedures not detailed here, and can be found online at:

http://www.horiba.com/fileadmin/uploads/Process-Environmental/Documents/U-50_Manual_revised_0409.pdf

2.0 Health and Safety Considerations

2.1 All proper personal protection clothing and equipment is to be worn.

2.2 The pH 4.01 standard calibration solution for auto-calibration of the Horiba U-50 Series Multiparameter Water Quality Meter contains potassium acid phthalate. When using the pH 4.01 calibration solution, avoid inhalation, skin contact, eye contact or ingestion. If skin contact occurs, remove contaminated clothing immediately. Wash the affected areas thoroughly with large amounts of water. If inhalation, eye contact or ingestion occurs, consult the Material Data Safety Sheets (MSDS) for prompt action, and in all cases seek medical attention immediately.

2.3 The ORP standard solution contains chemicals that can be possible irritants. When using the ORP standard solution, avoid inhalation, skin contact, eye contact or ingestion. If skin contact occurs, remove contaminated clothing immediately. Wash the affected areas thoroughly with large amounts of

water. If inhalation, eye contact or ingestion occurs, consult the MSDS for prompt action, and in all cases seek medical attention immediately.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Interferences

Each of the parameters measured with this procedure is subject to various interferences including cross-contamination, turbidity, aeration, and temperature fluctuations. Care must be taken to ensure that the instrument remains in a stable, controlled environment throughout the calibration and monitoring process; and that the conditions under which the samples are analyzed are the same as those under which calibration is conducted.

5.0 Equipment and Materials

The following items will be required to complete auto calibration of the Horiba U-50 Series Multiparameter Water Quality Meter:

- Horiba U-50 Series Meter Control Unit

- Sensor probe equipped with temperature sensor, pH sensor, ORP sensor, reference electrode, DO sensor, turbidity sensor and conductivity sensor
- Cleaning brush
- Soft cloth
- Alcohol
- Calibration cup
- Alkaline batteries
- Thermometer (National Institute of Standards and Technology)
- pH 4.01 Standard Solution/Auto Calibration Solution
- 229 mV ORP Standard Solution
- Alconox detergent
- Distilled water
- Ring stand or similar capable of holding the control unit and flow-through cell upright during low-flow groundwater sampling
- Gallon-size plastic freezer bags (e.g., Ziploc) to protect the control unit from rain
- Horiba Multi Water Quality Checker U-50 Series Instruction Manual

6.0 Procedures

6.1 **When to perform calibration and calibration checks.** All instrument sensors must be calibrated or calibration checked at the start of the work day before they are used to measure environmental samples. The instrument will be calibrated per the manufacturer's instructions and recommendations for timing of instrument calibration prior to start of sample collection procedures. Calibration should also be checked at the end of the sampling day and when anomalous readings are obtained.

6.2 **Temperature considerations for calibration checks**. If the air temperature changes, the readout value may not be stable. Ensure that the ambient air temperature is the same temperature as the calibration solution, because the internal probe temperature sensor and external temperature sensor (in the calibration solution) are used for the auto calibration. Allow the probe and calibration solution to equilibrate for one hour if a thermometer is not available to verify that these temperatures are the same. Do not hold the probe while performing the auto calibration. Body temperature may elevate the internal temperature sensor measurement creating DO calibration error.

6.3 Instrument Set-up steps for Calibration/Calibration Checks:

- Check the display/logger to determine the battery level in the display/logger to see if recharging is necessary.
- Wait at least 20 minutes after turning the system power on before calibrating, as the DO sensor requires time to "warm-up".

- During the 20-minute “warm-up” period, set the sensor probe up on a ring stand or other means to stabilize the sensor probe during the calibration / calibration checks.
- Prior to calibration or calibration check, all sensors must be cleaned. Failure to perform this step can lead to erratic measurements. Cleaning instructions are provided below:
  - Remove the sensor guard, and clean the sensors with tap water.
  - Clean the turbidity sensor with a soft bristled cleaning brush.
  - Remove the two screws securing the COND guard, and the COND guard itself, and use a soft bristled brush to gently remove any dirt from the conductivity sensor.
  - Wipe off any dirt with a soft cloth. If parts are very dirty, clean them with a solution of Alconox detergent, then rinse them. If parts are contaminated by oil, wipe it off with a soft cloth soaked in alcohol.
  - Put the COND guard back in place.
  - Remove the sensor guard cap, wash off any dirt with tap water, then put the guard cap back in place

6.3.1 For each of the calibration solutions, provide enough volume so that the probe and the temperature sensor are sufficiently covered. Below are step-by-step instructions on how to select measurement parameters to display in the control unit screen:

- Press and hold down the control unit’s POWER key for about 3 seconds to turn the power ON.
- Press the right key to switch the display to the "SETTINGS" screen.
- Press the down key to move the cursor to "Sensor selection", then press the ENTER key.
- Move the cursor to each measurement parameter to change, then press the ENTER key. A check in the check box of a measurement parameter indicates it will be displayed.
- To save the changes, press the up down left and right keys to move the cursor to SAVE, then press the ENTER key. If you don’t want to save the changes, press the ESC key.

6.3.2 Set up instrument display so that the following items are displayed:

- DO (in percent)
- ORP (in mV)
- DO (in milligrams per liter [mg/L])
- “COND” - Conductivity (in micro Siemens per centimeter [µs/cm])
- “SP COND” - Specific Conductivity (in. µs/cm)
- pH
- TURB – Turbidity

- Press and hold down the control unit's POWER key for about 3 seconds to turn the power ON. The "MEASUREMENT" screen appears after about 10 seconds.
- Press the right key to switch the display to the "SETTINGS" screen.
- Press the down key to move the cursor to "Measurement", then press the ENTER key.
- Press the down key to move the cursor to the desired measurement mode. Press the ENTER key to save the setting.
- Select "Interval measurement", the display switches to the screen used to set the measurement interval. Press the up and down keys to set the measurement interval. The measurement interval can be set to any value between 10 seconds and 24 hours in the case of the U-52 Model, or between 30 seconds and 24 hours in the case of the U-53 Model.

6.4 Auto Calibration procedures:

- Remove the sensor guard and rinse the sensor probe two or three times with distilled water.
- Remove the transparent calibration cup. The transparent calibration cup has "With TURB Measurement" and "Without TURB Measurement" gauge lines. Fill to the appropriate line for your probe configuration with pH 4.01 standard solution/auto calibration solution.
- Press the control unit's CAL key to set the calibration mode.
- Press the down key to select "Auto Calibration", then press ENTER key.
- Immerse the sensor probe in the transparent calibration cup. Check that all sensors are submerged in the calibration solution and that there are no air bubbles on any of the sensors.
- With the sensor probe still in the transparent calibration cup, place the transparent calibration cup into the black calibration cup.
- When all the sensor values have stabilized, press the ENTER key to start calibration. Do not remove the sensor probe from the calibration solution. U-53 Model turbidity data will display "_ _ _ " until the calibration is complete.
- Final calibration readings are documented on the field log as discussed in Section 7.
- Calibration is finished when the message "Cal complete. MEAS to measure." appears. Press the MEAS key to set the measurement screen, then start measurement. Note: If calibration error occurs, start calibration after first resolving the issue according to the manufacturer's Instruction Manual.
- Rinse all sensors with distilled water prior to use in measuring environmental samples.

6.5 Instrument shutdown and storage procedures:

- Prior to instrument shutdown, an end-of-day calibration will be performed and the final calibration readings will be documented.
- Replace clean caps over sensors.

- Select run mode. Reset the parameters to the following:
  - pH
  - specific conductivity
  - ORP
  - Temperature
  - DO milligrams per liter (mg/L)
- Shut off computer, and return to case

7.0 Quality Assurance/Quality Control

7.1 Quality Control

7.1.1 Criteria are summarized in Table 1.

7.2 Pollution Prevention

7.2.1 Containers used to calibrate the probes shall be sized to use the smallest amount of calibration solution possible but still adequately accommodate all sensors which need to be in the calibration solution.

7.2.2 pH 4.01 standard solution/auto calibration solution may be reused with caution to perform end-of-day calibration checks if properly stored. ORP standard solution may NOT be reused. New pH 4.01 standard solution/auto calibration solution and ORP standard solution shall be used to calibrate/calibration check the Multiparameter Water Quality Meter at the beginning of each day prior to use.

7.3 Waste Management

7.3.1 Unused calibration solutions should be returned to the AECOM equipment manager or equipment vendor for proper disposal.

7.3.2 Used calibration solution should be added to purge water for later disposal/treatment.

8.0 Data and Records Management

8.1 Calibration log sheets shall be used to document the details of instrument calibration and calibration checks. This includes calibration log sheets from the AECOM equipment manager or equipment vendor detailing calibrations and calibration checks conducted prior to releasing the instrument to the AECOM field crew.

8.2 The site logbook should be used to note when instrument calibration and instrument calibration checks were conducted, and should reference the calibration log sheets for details. This includes calibration log sheets from the AECOM equipment manager or equipment vendor detailing calibrations and calibration checks conducted prior to releasing the instrument to the AECOM field crew.

Calibration sheets will be maintained in the project files and provided to the United States Corps of Engineers PM/technical manager upon request.

8.3 Readings measured by instruments that are subsequently found to be outside of quality control calibration tolerances during the end-of-day calibration check shall be documented on the sampling worksheet used to document the sample collection.

9.0 Personnel Qualifications and Training

9.1 The PM is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOP and the Installation-Wide Work Plan.

9.2 The field operator is responsible for verifying that the instrument is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOP.

10.0 References

Horiba, Ltd., 2009. *Multi Water Quality Checker U-50 Series Instruction Manual*. April.

11.0 Revision History

Revision	Date	Changes
0	February 2013	AECOM, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

12.0 Tables

Table 1: Quality Control Calibration Tolerances

Parameter	**Before Start of Activities Calibration Check** (all values reflect 25°C)		**End-of-Day Calibration Check** (all values reflect 25°C)	
	Calibration Value	Tolerance	Calibration Value	Tolerance
Temperature	25°C	± 0.10°C	25°C	± 0.10°C
pH	pH 4.01	± 0.05 pH	pH 4.01	± 0.3 pH
Conductivity	0.449 S/m (4.49 mS/cm)	± 5%	0.449 S/m (4.49 mS/cm)	± 20%
Turbidity	0 NTU	±0.5 NTU	0 NTU	±0.5 NTU
Dissolved Oxygen	8.92 mg/L	± 0.5 mg/L	8.92 mg/L	± 0.5 mg/L
Oxidation-Reduction Potential	229 mV	± 10%	229 mV	± 10%

Abbreviations:

°C	degree centigrade
S/cm	Siemens per meter
µS/cm	micro Siemens per centimeter
NTU	Nephelometric Turbidity Units
mg/L	milligrams per liter
mV	mill volts

Standard Operating Procedure

Direct Push Technology

Attachment 16

Revision No.: 2

Revision Date: June 2014

Contents

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1.0 Scope and applicability

The purpose of this Standard Operating Procedure (SOP) is to define the requirements for using Direct Push Technology (DPT) equipment for subsurface investigations at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either: the AECOM LHAAP technical lead or the AECOM LHAAP Project Manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP. Deviations from the SOP will be captured in field documentation and noted in reports submitted to regulatory agencies.

This SOP describes the methods used to insert tools and sensors into the ground without the use of rotary drilling to move soil and make a path for the tool. Direct Push Technology (DPT) systems (i.e., Geoprobes, Stratoprobes, Hurricanes, etc.) are used to profile soils and obtain samples of soil, groundwater, and non-aqueous phase liquids. The system is also used to drive soil cores and soil gas sampling tools.

Applications include:

- Underground storage tank investigations
- Preliminary site assessments
- Vapor sampling
- Low overhead sites (indoors)
- Piezometer installation
- Air sparge well installation
- Continuous/discrete depth soil sampling
- Injection of treatment fluid media
    - Bio-products
    - Oxygen release compound chemicals
    - Hydrogen peroxide
    - Surfactants

The DPT system can be applied to obtain a field profile of site conditions in lieu of drilling, excavation, and more invasive exploration techniques. The system can characterize larger areas of a site more rapidly and with less cost than alternative exploration programs, advancing probes at a rate of 2 to 25 feet per minute.

Due to a hydraulic drive often aided by a pneumatic hammer, DPT techniques will penetrate a wide range of materials. However, direct push techniques often encounter refusal upon contact with coarse gravels, bedrock, and hard pan (e.g., caliche zones). Most DPT applications are effective in unconsolidated media less than 30 feet deep; however, depths of over 50 feet have been achieved under optimal conditions.

2.0 Health and safety considerations

This section presents the recommended safety precautions associated with DPT operations. The Site-Specific Health and Safety Plan (HASP) will address additional requirements and will take precedence. Under circumstances where potential airborne exposure is possible respiratory protective equipment may be required based on personal air monitoring results. Upgrades to Level C will be coordinated with the Site Safety and Health Officer (SSHO) or Environment, Health, and Safety Coordinator.

Consideration must be given to, but not limited to, the following precautionary measures:

- Appropriate personal protective equipment must be worn to prevent inhalation, ingestion, or trans-dermal exposure to potentially toxic contaminants during DPT operations. Consult the Site-Specific HASP for guidance. Note that, in addition to standard Level D protection, if warranted by exposure, chemically impervious gloves and air purifying respirators equipped with combination high efficiency particulate air/organic vapor or other suitable cartridges may be required. The use of respirators will be contingent upon the results obtained from area air monitoring.

- Excessive noise may be generated during hammer operation requiring the use of approved hearing protection.

- Always use the proper tools for the job including the use of scissor-type snips to cut tubing in lieu of pocketknives. Always use methods that will preclude hand injuries or contact with contaminated media. Hand injuries to operators, technicians, or geologists may occur while cutting open plastic sample sleeves.

- Exercise extreme caution if DPT operations are performed in the vicinity of overhead power lines.

- Ensure that underground utilities have been clearly identified and marked prior to DPT advancement operations. (See Section 5.1, Utilities)

- Avoid slips, trips, and falls on uneven surfaces

- Use caution when working in areas of active vehicular traffic. Employ traffic cones and barriers, as appropriate, to divert traffic and prevent injury to employees.

- Numerous pinch points exist on DPT equipment. Thoroughly brief project personnel on the location and avoidance of these pinch points on all actively operating machinery.

- Direct-push rigs are potentially dangerous due to stored energy (e.g., hydraulic cylinders and overhead masts) and rotating/mechanized parts. Ask the driller where the emergency power shut-off “kill-switches” are located; this information will be shared with all onsite personnel.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that all activities are conducted and documented in accordance with this SOP and any other appropriate procedures. This will be accomplished through staff training and by maintaining quality assurance/quality control.

3.3 Field Team

All field team members assigned to perform DPT activities are responsible for completing their tasks according to specifications outlined in this SOP and other appropriate procedures. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, issuing nonconformances, etc.) if problems occur.

4.0 Direct Push Equipment

Direct push equipment can be configured in various forms. Customized systems include truck-mounted rigs ranging from sophisticated systems using a 20-ton box truck (Cone Penetrometer Rigs) to all terrain vehicles and pickup trucks. The drive systems also vary for operation. The typical systems include:

Drive System (Typical)

- Drive Mechanism: Gas (typical: 18-Hp)/Propane/Diesel Engine and Electric Motor
- Pressure-compensated hydraulic pump/hammer
- Percussion Hammer (Example: 54-inch stroke, 2500 bl/min, 140 feet-pounds (ft-lbs) energy, 21,000 lbs of tool extraction force)

Boring System (Example)

- 2-inch O.D. x 48-inch-long outer rod casing with solid point or cutting shoe
- 1-inch O.D. x 48-inch-long inner rod casing for soil sampling
- 11/16-inch or 1-1/8-inch x 48-inch-long clear plastic sealable soil sample tubes
- 3/4-inch polyvinyl chloride (PVC) screen/solid well material

Samplers

- Soil
  - Bulk core soil samplers
  - Large borehole soil samplers
  - Dual tube soil samplers

- Groundwater
  - Screened point samplers
  - Slotted well point samplers
  - Direct conductivity probe
  - Membrane interface probe

System Components

- Percussion hammer
- Derrick
- Rod grip puller and block
- Hammer latch
- Foot cylinder pin
- Probe machine foot
- Hammer rotation valve
- Fold bracket (rig dependent)
- Hydraulic control levers
- Control panel
- Probe cylinder
- Foot cylinder
- Hose carrier
- Fold cylinder
- Extend cylinder
- Probe slide bracket
- Swing mount

5.0 Methods and Procedures

DPT probing offers a cost effective and efficient method for completing site investigations and light duty remediation jobs. It lends itself to areas where conventional rigs cannot access (indoors) and minimizes the amount of waste generated. Due to the variety of DPT probes, most contractors provide SOPs on the capability and operation of their equipment. It is recommended that AECOM Work Plans augment this SOP with those provided by the selected DPT contractor. A general description of the methods and procedures for DPT is provided below.

5.1 DPT Locations

Locations should be laid out by survey/tape measurement before advancing the probe. Ground elevations at each location should be determined by survey or from a recent topographic plan of the site, if possible. The AECOM representative should check the locations and report any discrepancies (especially where property lines and utilities are present) to the AECOM LHAAP technical lead or

AECOM Project Manager for resolution before probing starts. If possible, DPT equipment locations should not be in areas in close proximity to overhead power lines.

If a probe must be relocated because of potential safety hazards, obstructions, or inaccessibility, the distance and direction from the original location should be recorded. The move should be in such a direction to stay as close as possible to the proposed location.

Utilities

Be sure all utility locations in the area of proposed probes have been checked. Many states have "DIGSAFE," "Call Before You Dig," or similar organizations, which must be contacted a specified number of workdays before starting any underground excavations. For Texas, allow at least 48 hours (2 working days) prior to commencing excavation activities. Often these organizations only cover major utilities such as gas, electric, and telephone. They do not generally cover private water, sewer, storm drains, oil, steam, cable, or chemical lines. Therefore, contact local utilities or Departments of Public Works to field spot utility locations. Check around buildings and in basements for service connections of utilities entering buildings. All work will be performed in accordance with the Utility Clearance SOP. Utility clearance documentation will be maintained in the project files and provided to the United States Army Corps of Engineers Project Manager/technical manager upon request.

5.2 DPT Probing

Before actual excavation takes place, be sure the equipment is not in a location where it can overturn, slide, or settle during drilling activities. DPT equipment should be selected based on site conditions and job requirements. Any necessary monitoring equipment used during DPT drilling will be calibrated per the appropriate AECOM SOP and per the manufacturer's instructions.

Prior to advancing the direct push probe, determine what type of information and sampling will be needed during insertion, including:

- Soil sampling
- Groundwater sampling
- Soil gas sampling
- Conductivity logging
- Contaminant detection system monitoring
- Injection requirements
- Monitoring well or screen point installation

Prior to advancing the direct push probe, ensure all down-hole equipment has been decontaminated in accordance with the LHAAP Decontamination of Field Equipment SOP.

Clear all ground obstruction before beginning probe advancement. Use of percussion may be required at ground surface to penetrate hard packed soils.

Initiate push-probe advancement with the static weight of the rig only until encountering refusal. Apply percussion to advance the probe to greater depths following maximum penetration under static load. Use of percussion can be used alternatively with static pressure to push probes through hardpan layers, gravels, sand, high friction clays, tills, fill, and surface frost. Penetration under static pressure during continuous pushes will provide greater information on changes in stratification.

During advancement of the probe, be sure to log down pressures, depth of strata, and pore pressure changes, obstructions, and type of system advance with depth.

Open Hole Sampling

Open hole sampling typically includes a 4-foot-long, large-diameter sampler, which is driven and retracted in a continuous run. A 4-foot plastic liner will be placed in the sampler before each run, and then the sampler and liner are advanced to the design penetration depth 4 feet below the start elevation. Do not overdrive the sample tube. Compaction of the sample and deformation of the tube assembly may occur. After each recovery, the sampler will be placed back into the hole and another 4-foot rod added to the string and driven. The rods are retracted and a sample is retrieved. This process continues and additional rods are added in 4-foot sections until the desired depth is reached. This technique is generally effective above the water table.

Discrete Depth Sampling

Discrete depth soil sampling is accomplished by advancing a cone-tipped sampler to the desired sample depth. Once at the desired depth the cone-tipped sampler is removed and the open ended sampler is lowered into the hole and driven into the soil at the sampling depth. The sampler, with the soil, is pulled out of the hole and extruded for examination. This method of sampling can be conducted numerous times within the same borehole.

Monitoring Wells

Monitoring wells / piezometers are installed after a DPT sampling sequence, either in an open hole or inside a casing. Monitoring well sizes vary (e.g., 3/4-inch, 1-inch, 1.5-inch, 2-inch). A typical well inserted in the open hole or cased hole will be constructed of stainless steel, schedule 40 PVC, or other material if specified for the project. Screen slot sizes,may vary but will typically be 0.01-inch wide or as specified by the engineer/geologist. The well should be constructed as described in AECOM's Monitoring Well Installation Procedures SOP. However, it should be noted that wells constructed in DPT boreholes may not be accepted by regulatory agencies as viable monitoring wells. Prior discussions with the regulatory agency may be prudent before installing monitoring wells by this method.

Groundwater Grab Samples

In some instances, if a well cannot be installed or a permanent well is not required, a groundwater grab sample may be obtained using the direct push drilling methodology. Groundwater samples may be obtained using a small diameter bailer or, preferably, by pumping though tubing that placed through the drill rods to reach the screen. The expendable cone tip is released by inserting a thin rod through the drill rods to knock out the cone tip. The drill rods are then lifted to allow the screen to drop out of the sheath and into the open borehole. The groundwater, if present, will flow into the exposed screen. Groundwater samples may be obtained using a small diameter bailer or, preferably, by pumping though tubing that placed through the drill rods to reach the screen.

Boring Completion

Upon completion of the boring, backfill may be required. The backfill may consist of native material, hydrated bentonite chips/pellets, Portland cement/bentonite grout, or other low permeability material

as specified in the project-specific sampling plan. All applicable state/federal regulations concerning plugging of boreholes should be reviewed prior to the commencement of field activities.

6.0 Data and Records Management

Documentation may consist of all or part of the following:

- DPT logs/charts
- Engineer/geologist sampling forms (soil, water, air)
- Field log book
- Chain-of-custody forms
- Shipping receipts
- Health and safety forms

All documentation will be placed in the project files and retained following completion of the project.

7.0 Exception Provisions

None

8.0 Tables

None

9.0 Figures

None

10.0 Revision history

Revision	Date	Changes
0	27 March 2013	AECOM, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Chloride Analysis Using Titration Strips

Attachment: 17

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Chloride Analysis Using Titration Strips

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1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines and procedures for using Titration Strips (strips) when recording quantitative concentrations of chloride in process water at the groundwater treatment plant located at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by one of the following: the LHAAP technical lead or the LHAAP project manager before implementation.

Strips are disposable devices for measuring chloride (NaCl or Cl) in aqueous solutions. Consult the manufacturer's Instructions Manual for testing requirements and calibration table conversions to parts per million (ppm) chloride ion.

2.0 Health and Safety Considerations

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the site specific Health and Safety Plan (HASP). In the absence of a site-specific HASP, work will be conducted according to the Health and Safety Policy and Operations Manual and/or direction from the Regional Health and Safety Manager.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Equipment and Materials

Strips consist of a thin, chemically inert plastic sheath. Laminated within the sheath is a strip impregnated with a reagent. When strips are placed in a test solution, fluid rises up the strip by capillary action. The reagent reacts with the chloride ion in the solution and produces a white column in the strip. The height of this column is proportional to the total chloride concentration. The results are read by observing the number on the strip where the column peaks and then using the accompanying calibration table to convert the reading to ppm chloride ion.

Approximate titration range is 0.0005% NaCl (30 ppm Cl) to 1.0% NaCl (6,000 ppm Cl). Normal dilution procedures allow testing to 10% NaCl (60,000 ppm Cl). Additional dilutions may be made to test higher levels.

5.0 Procedures

Strips should be stored in a dry storage area and replaced prior to expiration date or every two years. Each strip must me checked for damage or dampness prior to each reading. Damaged strips shall be discarded to prevent future use. Procedures for using strips are as follows:

- Remove a strip from bottle and replace the bottle's cap immediately.
- Insert the lower end of the strip into the solution. Immerse the strip just beyond the yellow line at the top of the strip.
- Allow the solution to completely saturate wick of the strip. Reaction is complete when the yellow string turns dark. Remove the strip and document the reading and unit of measure.
- The strip will turn white based on the concentration level of chloride. Document where the tip of the white chloride peak falls on the numbered conversion scale. This represents the unit value.

NOTE: Filtration of the sample solution may be needed to prevent obstruction of the strip.

6.0 Data and Records Management

The site logbook should be used to document the date, time, and location of each reading and should reference the model name of the strip being used.

Readings measured that are subsequently found to be outside of normal readings should be retested to obtain accurate and reliable data.

7.0 References

AECOM, 2013. *Health and Safety Plan, Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, Texas 75661*, August.

AECOM, 2010. *S3NA-208-PR Personal Protective Equipment Program, Standard Operating Procedure (SOP) – North America*, December.

SHAW, 2011. *Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas, Appendix D Field Procedures.*

8.0 Revision History

Revision	Date	Changes
0	February 2013	AECOM, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Water Depth and Velocity Measurements

Attachment: 18

Revision No.: 2

Revision Date: June 2014

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8.0 Revision History....3

1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines and procedures for using a velocity flow meter (i.e., Flo-Mate or similar) used to measure the velocity and depth in a conductive liquid, such as water, at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by one of the following: the LHAAP technical lead or the LHAAP project manager before implementation.

The Flo-Mate uses an electromagnetic sensor to record velocity of liquid flowing in one direction and display the data on a digital display as feet per second or meters per second. Consult the manufacturer's Instructions Manual for additional calibration requirements and procedures.

2.0 Health and Safety Considerations

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the site specific Health and Safety Plan (HASP). In the absence of a site-specific HASP, work will be conducted according to the Health and Safety Policy and Operations Manual and/or direction from the Regional Health and Safety Manager.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Equipment and Materials

- Control Unit
- Cable
- Weight Hanger
- Sliding Rod
- Depth Gauge
- Sensor Mount
- Weight
- Sensor
- Instructions manual

5.0 Procedures

All instrument probes must be calibrated prior to being used to measure water depth and flow velocity. Calibration must be checked if any anomalous readings are obtained. The procedures for using a flow meter to measure surface water velocity are described below:

- Slide the sensor (wire side up) down the weight hanger (rod) to position the sensor exactly 1 foot below the top of the water. Tighten the set screw to securely fasten the sensor to the weight hanger at the desired length. Ensure the sensor is facing upstream.
- Position the sensor upstream and approximately 1 foot away from the river/creek bank. Take preventive measures to ensure personnel safety for the full duration of the work. Assess the edge of the river/creek bank for cohesive stability and slippery surfaces prior to any work being done.
- Document flow meter readings in the field logbook after each consecutive reading. An attempt shall be made to revisit each location to obtain consistency and comparable data during each event.
- Allow the water parameters to stabilize prior to recording the data. Repeat this procedure across the river/creek (perpendicular) at 1 foot intervals.

6.0 Data and Records Management

The site logbook should be used to document the time, location, depth, and weather conditions of each reading, and should reference the model number of the specific flow meter being used.

Field data shall be recorded into a task specific spreadsheet developed to calculate the average velocity in the water body being measured.

Readings measured by instruments that are subsequently found to be outside of normal readings should be sent back to the manufacturer for recalibration.

7.0 References

AECOM, 2013. *Health and Safety Plan, Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, Texas 75661*, 2013.

AECOM, 2010. *S3NA-208-PR Personal Protective Equipment Program, Standard Operating Procedure (SOP) – North America*, 2010.

AECOM, 2011. *S3NA-314 PR Working Alone and Remote Travel, Standard Operating Procedure (SOP) – North America*, 2011.

SHAW, 2011. *Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas, Appendix D Field Procedures*, 2011.

8.0 Revision History

Revision	Date	Changes
0	February 2013	AECOM, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Discharging Treated Groundwater into Harrison Bayou

Attachment 19

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Discharging Treated Groundwater into Harrison Bayou

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Standard Operating Procedure

Discharging Treated Groundwater into Harrison Bayou

1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines and procedures for data collection requirements prior to discharging treated groundwater into Harrison Bayou at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by one of the following: the LHAAP technical lead or the LHAAP project manager before implementation.

The premise of this work is the interim Record of Decision (iROD), which requires collection of the following data:

- Flow measurements in Harrison Bayou; and
- Sulfate and chloride concentrations in the treated groundwater.

2.0 Health and Safety Considerations

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the site specific Health and Safety Plan (HASP). In the absence of a site-specific HASP, work will be conducted according to the Health and Safety Policy and Operations Manual and/or direction from the Regional Health and Safety Manager.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Procedures

The effluent concentrations for chloride and sulfate (C_E) is determined at the on-site laboratory and the allowable discharge rate (Q_E) is calculated for both chloride and sulfate and the smaller value used. The steps are as follows:

- Collect a treated water sample from TK-560 tank.
- Measure chloride concentration following Installation-Wide Work Plan (IWWP) Appendix D SOP, Attachment 17, Chloride Analysis Using Titration Strips.
- Measure depth of water; and measure flow velocity every 1 foot at a specified location (e.g., along the handrail location) in Harrison Bayou following IWWP Appendix D SOP, Attachment 18, Water Depth and Velocity Measurements.
- Measure sulfate concentration following IWWP Appendix D SOP, Attachment 20, Sulfate Analysis Using Hach DR 3900.
- Input water depth, velocity measurements, sulfate concentration, and chloride concentration into the Groundwater Treatment Plant (GWTP) outfall calculation spreadsheet (see Attachment A) to determine an estimate of allowable discharge flow rate of treated effluent.

The information in the iROD provides the following information related to data collection:

Note: Discharge limits for chloride and sulfate are to be based on discharge rates using the following formula:

$$C_c \geq \frac{Q_s\, C_A + Q_E\, C_E}{Q_E + Q_S}$$

Where:

C_A = Chloride/Sulfate (ambient), 10,000 micrograms per liter (ug/L) (from State of Texas Water Quality Inventory)

C_C = Chloride/Sulfate criteria, 100,000 ug/L for Chloride and 50,000 ug/L for Sulfate (from State of Texas Water Quality Inventory)

C_E = Effluent Concentration (discharge limit) in μg/L

Q_E = Treated Groundwater Discharge Rate in cubic feet per second (cfs). The groundwater pumping and treatment rate shall be adjusted as necessary in order to meet the required effluent concentration C_E

Q_S = Flow rate in the receiving stream, Harrison Bayou and/or Central Creek, in cfs. This flow rate shall be measured at a constant location no less than 100 feet upstream from the point of *discharge of treated groundwater*. Measurements will be taken daily in Harrison Bayou and Central Creek in accordance with Texas Natural Resource Conservation Commission's Water Quality Monitoring Manual, August 1994.

Example: For a discharge rate of 250,000 gallons per day or, 0.39 cfs, and a flow rate in the receiving stream of 4 cfs, the discharge limit for chloride would be:

$$100{,}000 = \frac{(4.0)(10{,}000) + (0.39)(C_E)}{0.39 + 4.0}$$

C_E = 1,023,000 ug/L

5.0 Data and Records Management

The GWTP outfall calculation sheet should be used to document the flow rate (in Harrison Bayou), effluent chloride concentration, and effluent sulfate concentration. In addition, the field operator must document the sample ID, date, and time. The outfall calculation sheet is provided in Attachment A.

Field data shall be recorded into a task specific spreadsheet developed to calculate the average velocity in Harrison Bayou.

All field documentation shall be stored on-site for the minimum duration of 5 years.

6.0 References

AECOM, 2012. *Health and Safety Plan, Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, Texas*, August.

AECOM, 2013. Installation-Wide Work Plan, Appendix D SOP, Attachment 17, *Chloride Analysis Using Titration Strips*, February.

AECOM, 2013. Installation-Wide Work Plan, Attachment 18, *Water Depth and Velocity Measurements*, February.

AECOM, 2013. Installation-Wide Work Plan, Attachment 20, *Sulfate Analysis Using Hach DR 3900*, February.

AECOM, 2010. *S3NA-208-PR Personal Protective Equipment Program, Standard Operating Procedure (SOP) – North America*, December.

SHAW, 2011. *Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas, Appendix D, Field Procedures,* May.

Texas Natural Resource Conservation Commission, 1994. *Water Quality Monitoring Manual*, August.

7.0 Revision history

Revision	Date	Changes
0	February 2013	AECOM, Initial Version
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2	June 2014	AECOM Revision

Attachment A - Harrison Bayou Outfall Calculation Spreadsheet

This is an interactive spreadsheet

Standard Operating Procedure

Sulfate Analysis Using Hach DR 3900

Attachment: 20

Revision No.: 2

Revision Date: June 2014

Standard Operating Procedure

Sulfate Analysis Using Hach DR 3900

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Standard Operating Procedure

Sulfate Analysis Using Hach DR 3900

1.0 Scope and Applicability

The purpose of this Standard Operating Procedure (SOP) is to establish guidelines and procedures for using the Hach DR 3900 (powder pillows test) for sulfate analysis at the groundwater treatment plant (GWTP) located at the Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions.

The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by one of the following: the LHAAP technical lead or the LHAAP project manager before implementation.

This procedure is equivalent to U.S. Environmental Protection Agency Method 375.4 for wastewater. Consult the manufacturer's Instruction Manual for testing requirements and troubleshooting instrument failures.

2.0 Health and Safety Considerations

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the site specific Health and Safety Plan (HASP). In the absence of a site-specific HASP, work will be conducted according to the Health and Safety Policy and Operations Manual and/or direction from the Regional Health and Safety Manager.

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining

personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Equipment and Materials

User should read the entire SOP prior to unpacking, setting up, or operating this equipment. Below is a list of supplies and equipment used to calibrate and run samples for the determination of sulfate concentration in wastewater:

- Reagent Powder Pillows
- Sample Cells
- Sulfate standard solution 1000 mg/L
- Seven 100 milliliter (mL) Class A volumetric flasks
- 1-10 mL TenSette pipet and tips

SulfaVer 4 contains barium chloride. The final solution will contain barium chloride (D005) at a concentration regulated as a hazardous waste by the Federal Resource Conservation and Recovery Act. Refer to the Site Material Safety Data Sheet for safe handling and first aid precautions.

5.0 Equipment Handling

Follow the below equipment handling procedures for proper instrument operation, and to ensure long service life:

- Place the instrument firmly on an even surface. Do not push any objects under the instrument.
- The ambient temperature must be 10 to 40 degrees Celsius.
- The relative humidity should be less than 80 percent. Moisture should not condense on the instrument.
- Leave at least a 15 centimeter clearance at the top and on all sides for air circulation to avoid overheating of electrical parts.
- Do not operate or store the instrument in dusty, humid or wet locations.

6.0 Calibration

Calibration is recommended for the SulfaVer 4 method for the best accuracy. Complete the following steps to enter a new calibration curve in the instrument. Perform this procedure for each new lot of reagent.

1. Prepare seven calibration standards (10, 20, 30, 40, 50, 60, and 70 milligrams per liter [mg/L] SO_4^{2-}) as follows. Use the TenSette pipet to add 1, 2, 3, 4, 5, 6, and 7 mL of the 1000 mg/L sulfate standard solution to 7 different 100 mL Class A volumetric flasks.
2. Dilute each flask to the mark with de-ionized (DI) water, and mix thoroughly.
3. Use each standard solution in place of the sample and follow the SulfaVer 4 powder pillow procedure as noted below.

7.0 Procedures

The DR 3900 instrument is a visible spectrophotometer with a wavelength range of 320 to 1100 nm and is used to analyze sulfate concentrations in liquid solutions. Below are the procedures for sampling wastewater at the Longhorn GWTP using the DR 3900. Each sample is analyzed at the Longhorn GWTP on-site laboratory.

- Collect a water sample from the TK-650 effluent tank.
- Turn the DR 3900 on; select stored programs; then scroll down to program 680 Sulfate and push select.
- Remove the 3 SulvaVer 4 powder pillows from the Hach packet.
- Using the 5 mL pipette and glass beaker, dilute the sample 4:1 (e.g., 20 mL of DI water and 5 mL of sample).
- Using the 5 mL pipette, fill one 10 mL cell with 10 mLs of DI water and one SulvaVer 4 powder pillow and shake well. Then fill the other two 10 mL cells with 10 mLs of diluted sample and one SulvaVer 4 powder pillow per cell and shake well.
- Wipe all three cells clean with a paper towel.
- Insert the blank (DI water and powder pillow) into instrument and press the timer and select 5 minute time.
- After the 5 minute timer is finished, press zero to zero the machine.
- Remove the blank from machine and insert the first sample and press read. Then take the reading and multiply by 4 (to account for dilution of 4:1) and record the value in the site log book.
- Rinse all cells with DI water when finished.
- Turn DR 3900 off.

8.0 Data and Records Management

The site logbook should be used to document the date, time, sample ID, and steps taken for each reading and should reference the model name of the instrument used.

Readings measured that are subsequently found to be outside of normal readings should be retested to obtain accurate and reliable data. If abnormal results are repeated, recalibrate the instrument and run the test again.

All field documentation shall be stored for the minimum duration of 5 years.

9.0 References

AECOM, 2010. *S3NA-208-PR Personal Protective Equipment Program, Standard Operating Procedure (SOP) – North America*, December.

AECOM, 2013. *Health and Safety Plan, Remediation of Multiple Sites, Longhorn Army Ammunition Plant, Karnack, Texas*, 2013.

SHAW, 2011. *Final Installation-Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas, Appendix D, Field Procedures,* May.

10.0 Revision history

Revision	Date	Changes
0	February 2013	AECOM, Initial Version
1	12 June 2013	AECOM Revision
2	June 2014	AECOM Revision

Standard Operating Procedure

Air Sampling

Attachment 21

Revision No.: 1

Revision Date: June 2014

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1.0 Purpose and Summary

This Standard Operating Procedure (SOP) provides methods to be used for the monitoring and collection of air samples (ambient air or effluent gas) for the purpose of evaluating the ambient air concentrations and concentrations in the air stripper effluent air. The SOP specifically provides methods for air monitoring, ambient air sampling, and effluent gas sampling at the Groundwater Treatment Plant (GWTP), located at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas.

The effluent air sampling will be conducted consistent with the procedures described in the United States Environmental Protection Agency (USEPA) Environmental Response Team SOP #2008 entitled *General Air Sampling Guidelines* (1994) as well as air sampling best practices.

The procedures and equipment requirements contained in this SOP are subject to modification based upon project specific requirements and site conditions. The procedures in this SOP have been modified from multiple guidance documents listed in the reference section to reflect the typical field conditions encountered at LHAAP. The procedures are subject to change if unusual or unanticipated field conditions are encountered; however, all deviations must be approved by either the AECOM LHAAP technical lead or the AECOM LHAAP project manager before implementation. This information shall in turn be passed on to the USACE Technical Manager prior to the acceptance of the change in SOP.

2.0 Health and safety considerations

The health and safety considerations for the work associated with this SOP, including both potential physical and chemical hazards, will be addressed in the site specific Health and Safety Plan (HASP). In the absence of a site-specific HASP, work will be conducted according to the Health and Safety Policy and Operations Manual and/or direction from the Regional Health and Safety Manager. Note that effluent air sampling typically requires Level D personal protective equipment (PPE) unless there is a potential for airborne exposures to site contaminants.

Health and safety hazards include, but are not limited to, the following:

- Hazardous materials (exposure and/or release)
- High noise levels
- Eye hazards
- Air quality (i.e., chemical, dust, explosive conditions)
- Uneven walking/working surfaces and potential for trips and slips
- Pinch points
- Loose clothing
- Overhead hazards
- Hand hazards

3.0 Responsibility Matrix

3.1 Project Manager

The Project Manager has the responsibility of overseeing and directing the entire project, and ensuring that all activities are conducted in accordance with the client's direction, this SOP and any other appropriate procedures.

3.2 Field Team Leader

The Field Team Leader is responsible for ensuring that field activities are completed to meet the project objectives, are conducted in accordance with the project plans and requirements, and all activities are performed according to the respective procedures.

3.3 Field Team

All members of the field team (e.g., samplers, technicians, field geologists, engineers, etc.) are responsible for understanding and implementing this field procedure as well as ensuring all team members perform work in accordance with this procedure. All staff are responsible for reporting deviations from the procedures to the Field Team Leader or AECOM LHAAP Technical Manager.

3.4 Site Contractor Quality Control Systems Manager (CQCSM)

The CQCSM is responsible for periodic review of field generated documentation associated with this SOP. The CQCSM is also responsible for the implementation of corrective action (i.e., retraining personnel, additional review of work plans and SOPs, variances to the abandonment requirements, issuing nonconformances, etc.) if problems occur.

4.0 Procedures, Equipment and Supplies

4.1 Recommended Materials, Equipment, or Supplies

- General Materials
  - Field notebook and field log forms
  - Chain of custody records
  - Sample labels
  - Custody seals
  - Tool box with hand tools
  - Monitoring instruments and sample canisters with appropriate fittings to connect to the effluent air stripper soil gas probe assembly when sampling
  - Photoionization Detector (PID) and calibration gas
  - Sample shipping containers and materials
  - A copy of the site-specific HASP

- Air Sampling Apparatus and Materials
  - Summa® canister – electropolished, evacuated and wrapped for shipping
  - Connecting tubing - Stainless steel tubing (straight and splitter) and valves
  - Shipping Container – suitable for protection of canister during shipping
  - Wrenches and screw drivers of various sizes (clean and free of contaminants)
  - Negative pressure gauge (clean and free of contaminants)– typically installed on the canister to check canister pressure

4.2 General Requirements

4.2.1 *Air Monitoring*

Air monitoring of the sampling line and immediate vicinity may be conducted in order to evaluate the presence or absence of volatile organic compounds (VOCs) using a PID.

PID screening

PID screening procedure of the effluent line should be used to monitor for the presence of VOCs in the effluent line and/or surroundings prior to sampling.

Sampling equipment for PID screening include a PID (Mini-Rae 3000, 11.7-electronvolt [eV] lamp) or equivalent for VOC monitoring. The PID should detect combustible organic compounds such as chlorinated VOCs. The detection limit for the PID is 0.1 parts per million (ppm), with a range of 0 to 10,000 ppm. The PID should detect all organic compounds with an ionization potential below 11.7 eV; however, it cannot distinguish between one VOC and another (e.g., methylene chloride and benzene). The PID should be checked and calibrated according to the manufacturer's directions prior to use. **Appendix A** provides PID calibration procedures.

Standard procedures supplied from the manufacturer should be followed for PID screening. Data collected during monitoring events should be documented and evaluated in conjunction with information obtained from samples collected using Summa Canisters and analyzed by the laboratory.

4.2.2 *Effluent Air Sampling*

Effluent air sample are collected from a sampling port located in the effluent line before the air is released into the atmosphere. Evacuated, polished, 6-liter Summa® canisters that meet all the requirements specified for USEPA Method TO-15/Selective Ion Monitoring (SIM) should be used to collect air samples.

Collecting samples using Summa® canisters

Clean sampling protocols must be followed all times when handing and collecting samples. This requires care in the shipping, storage and use of all sampling equipment. Personnel that perform the sampling must maintain appropriate cleanliness: no smoking, eating or drinking, perfumes, or deodorants, and clean over garments are required (not dry cleaned).

Prior to the collection of air samples, the following parameters should be measured in the effluent line and recorded on the appropriate form: VOCs (using a PID).

The stagnant air present in the effluent line and the sampling train must be removed to ensure that the collected sample is representative of VOC concentrations in the effluent air. Information about the effluent line length and inner diameter should be used to calculate the "dead volume" of air in the effluent line. It is recommended to purge a minimum of three volumes of the effluent line. If the effluent line is under sufficient positive pressure, the line can be purged by opening the sampling port valve and allowing a free flow of air out of the effluent and sampling train lines. This is an acceptable procedure because the concentrations of VOCs are such that no explosive atmospheres would be created. Purge volume is typically determined to be sufficient when the PID reading in the purge line reaches an asymptotic steady concentration, indicating that the VOC concentrations in the purge line are the same as the VOC concentrations in the air stripper effluent. The maximum PID reading and the steady PID reading should be noted in the field log book.

All connections, fittings, sampling port valve, etc. should be checked for physical integrity prior to purging. Visibly damaged equipment will not be used during sampling.

Sampling System Leak Check:

Leakage of atmospheric air into the sampling system during sampling can compromise sample integrity and dilute measured soil vapor hydrocarbon concentrations ("false negative") or allow the entrance of ambient air contaminants into the sampling system ("false positive").

Summa® canister should be inspected for physical integrity prior use. Summa® canister vacuum pressure indicated on the laboratory's evacuation tag can be compared with measured vacuums to determine possible leakage during transportation. Canisters with potential leakage will not be used. The recommended vacuum pressure for air sampling using Summa® canister ranges from -30 to -28 inches of mercury (Hg). If the pressure in the canister is less than -28 inches of Hg, it may be an indication the canister integrity has been compromised. The canister use should be discontinued. The canister ID, initial vacuum, and all other pertinent information related to the sampling effort will be recorded in the field notes.

Sampling Procedures:

Once the above listed topics have been addressed, and after making certain that all connections between the Summa® canister and all other portions of the sampling system are tight, the effluent air sampling will commence by opening the sampling port valve and the canister valve.

Air stack effluent air samples will be obtained by slowly opening the valve to evacuate canister vacuum and slowly bringing it to equilibrium with the source. A low flow rate of air from the effluent line to the canister is preferable to reduce the possibility of leakage of ambient air into the sampling equipment. A flow controller provided by the laboratory will maintain a uniform flow rate throughout the duration of the sampling. The vacuum pressure change on the canister gauge should be monitored several times during the course of the sampling period to ensure the canister is filling at the desired rate.

Ambient air samples at the GWTP and downwind are also collected using Summa® canisters. These canisters are laboratory-equipped with flow regulators to collect air samples over a defined period of time: 8-hour composite sample for the GWTP ambient air sample and 24-hour composite sample for the downwind ambient air sample. A flow controller provided by the laboratory will maintain a uniform flow rate throughout the duration of the sampling. The most common range of flow rates in mL/min for given time intervals is provided in Section 8.0 Tables.

The sampling will be considered complete when the vacuum in the canister has decreased to -5 inches of Hg. After sampling is complete, all sample information should be written on the label supplied with the canister or affix label on the canister label tag. ***Do not affix any labels to the canister body***.

4.3 Data Collection and Quality Control

Proper data collection and quality control will ensure that data are representative, defensible, and readily accepted by all stakeholders. The analytical method chosen for the analysis, the use of replicate and other quality control samples, and proper documentation of the air monitoring/sampling activities will ensure that data meet the expectations of all parties involved.

Analytical Method

Unless otherwise specified in the project Work Plan, samples should be analyzed for VOCs by USEPA Method TO-15 or an equivalent method. The minimum detection limit for the analysis should be at least one part per billion (ppb) (1 to 7 micrograms per cubic meter depending on the molecular weight for each compound). All samples collected should be analyzed using an USEPA-certified laboratory.

Leak Testing

Leakage of atmospheric air into the sampling equipment during sampling can compromise sample integrity and dilute measured soil vapor hydrocarbon concentrations, possibly to the point that the concentration is below the method detection level (i.e., a “false negative”). Contaminants in ambient air can also enter the sampling system and be detected in the sample from a non-contaminated sampling probe (i.e., a “false positive”). Air leakage can occur in the sampling system through loose fittings in the sampling equipment.

Ambient air sampling using Summa® canisters do not require leak testing because the sample collected is obtained directly from ambient air. Sampling the GWTP effluent stack air is conducting using an air sampling port which is slightly under positive pressure such that when the sampling port valve is opened, a release of air stack air occurs into the atmosphere. Before the sample is collected, the air sampling line is purged by allowing the stack air to flow through the sampling line. Purging is complete when the PID reading of the air sampling line reaches a steady state condition, representing the concentration of VOCs in the air stack effluent stream. When this condition is established, a Summa® canister sampling line is connected to the air stripper air effluent line to collect the air sample. The Summa® canister valve is then opened to collect the sample. Because the stripper air sampling line is under positive pressure, introduction of ambient air into the line or the Summa® canister is not possible.

5.0 Quality Assurance/Quality Control

Unless otherwise specified in the project Work Plan, quality assurance/quality control (QA/QC) samples should be collected to ensure that data is representative, defensible, and readily accepted by all parties. QA/QC samples should include: duplicate samples (one for every 10 samples) and method blanks (one for every 10 samples). No field blanks or trip blanks will be included in the QA/QC program.

Field duplicate samples should be collected at the site during sampling activities. Duplicate samples should be obtained each sampling day or event, or from a minimum of 10% of the samples obtained. A duplicate sample is obtained by use of a splitter affixed upgradient of the flow controller, with separate sampling tubes connected to two individual Summa® canisters. Due to use of the splitter and simultaneous filling of the canisters, the sampling time required to obtain a duplicate sample could be doubled.

All Summa® canisters shall be certified 100% clean by GC/MS analysis by the laboratory before being used in the field. Certification of cleaning and evacuation should be noted by field personnel prior to collection of the samples. Site name, sample location, number, and date should be recorded on a chain of custody form and on a blank tag attached to the canister.

Once samples are collected they should be stored according to the method protocol (at ambient temperature) and delivered to the analytical laboratory as soon as possible. Samples should not exceed recommended holding times prior to being processed by the laboratory. Sample holding times for canisters is variable and may range from 72 hours (Cal EPA, 2003) to 14 days (USEPA, 1999). Laboratory procedures for sample accession and chain of custody should be followed.

6.0 Documentation

Calibration and inspection equipment (e.g., PID) should be performed prior to the start of the monitoring/sampling events. All instrumentation should be operated in accordance with operating instructions as supplied by the manufacturer and laboratory, unless otherwise specified in the Work Plan. Equipment checkout and calibration activities must occur prior to site sampling and must be documented.

Field logbooks and/or log sheets and any other soil gas measurement documentation shall be placed in the project files and retained following completion of the project.

7.0 Cross Reference

Cal EPA, 2003. Advisory. – Active Soil Gas Investigation. Jointly issued by the Regional Water Quality Control Board, Los Angeles Region, and the Department of t Toxic Substances Control.

USEPA, 1994. *General Air Sampling Guideline*. SOP#: 2008, Revision 0.0. www.ert.org/products/2008.pdf: United States Environmental Protection Agency, Environmental Response Team. November.

USEPA, 1999. Volatile Organic Compounds (VOCs) in Air (Ambient Air/Soil Vapor/Stack Gas) Samples Collected in Specially-Prepared Canisters and Analyzed by Gas Chromatography/Mass Spectrometry (GC/MS) EPA Method TO-15 (January 1999). Table 1A. Summary of Holding Times and Preservation for Volatile Organic Compounds (VOCs) in Air.

8.0 Tables

The Summa® canisters that shall be used for air sampling will be 6 liter canisters.

Sampling Interval (hrs)	0.5	1	2	4	8	12	24
6 L Canister Flow Rate (mL/min)	167	83.3	41.7	20.8	11.5	7.6	3.5

9.0 Figures

None

10.0 Attachments

Attachment A: Operation/Calibration of a Photoionization Detector (PID)

11.0 Revision History

Revision	Date	Changes
0	26 November 2013	AECOM, Initial Version
1	June 2014	AECOM Revision

Attachment A: Operation/Calibration of a Photoionization Detector (PID)

Prepared for:
Chevron
Van, Texas

Standard Operating Procedures Operation/Calibration of a Photoionization Detector (PID)

Les Cale
Prepared By

Reviewed By

ENSR
February 1, 2007
Document No.: 315Van

ENSR | AECOM

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Standard Operating Procedures Operation/Calibration of a Photoionization Detector (PID)

Author: Les Cole
SOP No.: 315Van
Revision: 0.0
Date: February 2007

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ENSR | AECOM

Standard Operating Procedures Operation/Calibration of a Photoionization Detector (PID)

Author: Les Cole
SOP No.: 315Van
Revision: 0.0
Date: February 2007

1.0 INTRODUCTION

1.1 Purpose and Applicability

This document describes the procedures that will be followed by field staff for operation and calibration of a photoionization detector (PID). The PID is primarily used by ENSR personnel for safety and survey monitoring of ambient air, determining the presence of volatiles in soil and water, and detecting leakage of volatiles.

PIDs routinely used by ENSR personnel include the Photovac Microtip, Thermoelectron 580B, and MiniRAE 2000. Personnel responsible for using the PID should first read and thoroughly familiarize themselves with the instrument instruction manual.

1.2 Principle of Operation

The PID is a non-specific vapor/gas detector. The unit generally consists of a hand-held probe that houses a PID, consisting of an ultraviolet (UV) lamp, two electrodes, and a small fan which pulls ambient air into the probe inlet tube. The probe is connected to a readout/control box that consists of electronic control circuits, a readout display, and the system battery. Units are available with UV lamps having an energy from 9.5 electron volts (eV) to 11.7 eV.

The PID analyzer measures the concentration of trace gas present in the atmosphere by photoionization. Photoionization occurs when an atom or molecule absorbs a photon of sufficient energy to release an electron and become a positive ion. This will occur when the ionization potential of the molecule (in electron volts (eV)) is less than the energy of the photon. The source of photons is an ultraviolet lamp in the probe unit. Lamps are available with energies ranging from 9.5 eV to 11.7 eV. All organic and inorganic vapor/gas compounds having ionization potentials lower than the energy output of the UV lamp are ionized and the resulting potentiometric change is seen as a positive reading on the unit. The reading is proportional to the concentration of organics and/or inorganics in the vapor.

Sample gases enter the probe through the inlet tube and enter the ion chamber where they are exposed to the photons emanating from the UV lamp. Ionization occurs for those molecules having ionization potentials near to or less than that of the lamp. A positive-biased polarizing electrode causes these positive ions to travel to a collector electrode in the chamber. Thus the ions create an electrical current which is amplified and displayed on the meter. This current is proportional to the concentration of trace gas present in the ion chamber and to the sensitivity of that gas to photoionization.

In service, the analyzer is first calibrated with a gas of known composition equal to, close to, or representative of that to be measured. Gases with ionization potentials near to or less than the energy of the lamp will be ionized. These gases will thus be detected and measured by the analyzer. Gases with ionization potentials greater than the energy of the lamp will not be detected. The ionization potentials of the major components of air, i.e., oxygen, nitrogen, and carbon dioxide, range from about 12.0 eV to 15.6 eV and are not ionized by any of the lamps available. Gases with ionization potentials near to or slightly higher than the lamp are partially ionized, with low sensitivity.

1.3 Specifications

Refer to the manufacturer's instructions for the technical specifications of the instrument being used. The operating concentration range is typically 0.1 to 2,000 ppm isobutylene equivalent.

1.4 Quality Assurance Planning Considerations

The end use of the data will determine the quality assurance requirements that are necessary to produce data of acceptable quality. These quality assurance requirements will be defined in the site-specific Work Plan (WP), hereafter referred to as the project plan.

1.5 Health and Safety Considerations

The health and safety considerations for the site, including both potential physical and chemical hazards, will be addressed in the site-specific Health and Safety Plan (HASP). In the absence of a site-specific HASP, work will be conducted according to the ENSR Health and Safety Policy and Procedures Manual and/or direction from the Regional Health and Safety Manager.

Only PIDs stamped Division I Class I may be used in explosive atmospheres. Refer to the project HASP for instructions pertaining to instrument use in explosive atmospheres.

2.0 RESPONSIBILITIES

- The project manager is responsible for ensuring that project-specific requirements are communicated to the project team and for providing the materials, resources, and guidance necessary to perform the measurements in accordance with this SOP and the project plan.
- The field operator is responsible for verifying that the PID is in proper operating condition prior to use and for implementing the calibration and measurement procedures in accordance with this SOP and the project plan.

3.0 REQUIRED MATERIALS

- Calibration Gas: Compressed gas cylinder of isobutylene in air or similar stable gas mixture of known concentration. The selected gas should have an ionization potential similar to that of the vapors to be monitored, if known. The concentration should be at 50-75% of the range in which the instrument is to be calibrated.
- Regulator for calibration gas cylinder
- Approximately 6 inches of Teflon tubing
- Tedlar bag (optional)
- Commercially-supplied zero grade air (optional)
- "Magic Marker" or "Sharpie" or other waterproof marker

- Battery charger
- Moisture traps
- Spare lamps
- Manufacturer's instructions
- Field data sheets or logbook/pen

4.0 METHOD

4.1 Preliminary Steps

4.1.1 Preliminary steps (battery charging, check-out, calibration, maintenance) should be conducted in a controlled or non-hazardous environment.

4.2 Calibration

4.2.1 The PID must be calibrated in order to display concentrations in units equivalent to ppm. First a supply of zero air (ambient air or from a supplied source), containing no ionizable gases or vapors is used to set the zero point. A span gas, containing a known concentration of a photoionizable gas or vapor, is then used to set the sensitivity.

4.2.2 Calibrate the instrument according to the manufacturer's instructions. Record the instrument model and identification number, the initial and adjusted meter readings, the calibration gas composition and concentration, and the date and the time in the field records.

4.2.3 If the calibration cannot be achieved or if the span setting resulting from calibration is 0.0, then the lamp must be cleaned (Section 4.4).

4.3 Operation

4.3.1 Turn on the unit and allow it to warm up (minimum of 5 minutes). Check to see if the intake fan is functioning; if so, the probe will vibrate slightly and a distinct sound will be audible when holding the probe casing next to the ear. Also, verify on the readout display that the UV lamp is lit.

4.3.2 Calibrate the instrument as described in Section 4.2, following the manufacturer's instructions. Record the calibration information in the field records.

4.3.3 The instrument is now operational. Readings should be recorded in the field records.

4.3.4 When the PID is not being used or between monitoring intervals, the unit may be switched off to conserve battery power and UV lamp life; however, a "bump" test should be performed each time the unit is turned on and prior to taking additional measurements. To perform a bump test, connect the outlet tubing from a Tedlar bag containing a small amount of span gas to the inlet tubing on the unit and record the reading. If the reading is not within the tolerance specified in the project plan, the unit must be recalibrated.

4.3.5 At the end of each day, recheck the calibration. The check will follow the same procedures as the initial calibration (Section 4.2) except that no adjustment will be made to the instrument. Record the information in the field records.

4.3.6 Recharge the battery after each use (Section 4.4).

4.3.7 When transporting, ensure that the instrument is packed in its stored condition in order to prevent damage.

4.4 Routine Maintenance

4.4.1 Routine maintenance associated with the use of the PID includes charging the battery, cleaning the lamp window, replacing the detector UV lamp, replacing the inlet filter, and replacing the sample pump. Refer to the manufacturer's instructions for procedures and frequency.

4.4.2 All routine maintenance should be performed in a non-hazardous environment.

4.5 Troubleshooting Tips

4.5.1 One convenient method for periodically confirming instrument response is to hold the sensor probe next to the tip of a magic marker. A significant reading should readily be observed.

4.5.2 Air currents or drafts in the vicinity of the probe tip may cause fluctuations in readings.

4.5.3 A fogged or dirty lamp, due to operation in a humid or dusty environment, may cause erratic or fluctuating readings. The PID should never be operated without the moisture trap in place.

4.5.4 Moving the instrument from a cool or air-conditioned area to a warmer area may cause moisture to condense on the UV lamp and produce unstable readings.

4.5.5 A zero reading on the meter should not necessarily be interpreted as an absence of air contaminants. The detection capabilities of the PID are limited to those compounds that will be ionized by the particular probe used.

4.5.6 Many volatile compounds have a low odor threshold. A lack of meter response in the presence of odors does not necessarily indicate instrument failure.

4.5.7 When high vapor concentrations enter the ionization chamber in the PID the unit can become saturated or "flooded". Remove the unit to a fresh air environment to allow the vapors to be completely ionized and purged from the unit.

5.0 QUALITY CONTROL

Calibration of the PID will be conducted at the frequency specified in the project plan. In the absence of project-specific guidance, calibration will be performed at the beginning of each day of sampling and will be checked at the end of the sampling day or whenever instrument operation is suspect. The PID will sample a calibration gas of known concentration. The instrument must agree with the calibration gas within ±10%. If the instrument responds outside this tolerance, it must be recalibrated.

Checks of the instrument response (Section 4.5.1) should be conducted periodically and documented in the field records.

6.0 DOCUMENTATION

Safety and survey monitoring with the PID will be documented in a bound field logbook, or on standardized forms, and retained in the project files. The following information is to be recorded:

- Project name and number.
- Instrument manufacturer, model, and identification number.
- Operator's signature.
- Date and time of operation.
- Calibration gas used.
- Calibration check at beginning and end of day (meter readings before adjustment).
- Span setting after calibration adjustment.
- Meter readings (monitoring data obtained).
- Instances of erratic or questionable meter readings and corrective actions taken.
- Instrument checks and response verifications – e.g., battery check, magic marker response (Section 4.5.1) or similar test.

7.0 REFERENCES

United States Environmental Protection Agency. Environmental Investigations Standard Operating Procedures and Quality Assurance Manual (EISOPQAM). USEPA, Region 4, SESD, Enforcement and Investigations Branch, Athens, GA. November 2001.

Subject:	**Final Minutes, Monthly Managers' Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**LHAAP Army Trailer and Teleconference – 866-203-6896, passcode 1759304791**
Date of Meeting:	**August 7, 2014 – 10:00 AM**

Attendees:

Army BRAC:	Rose Zeiler
EPA:	Rich Mayer, Kent Becher (USGS Liaison), Barry Forsythe (USFWS Liaison - by phone)
TCEQ:	April Palmie, Dale Vodak
USACE:	Aaron Williams
AECOM:	Dave Wacker, Bill Gabehart, Gretchen McDonnell (by phone)
AEC:	Robin Paul
USFWS:	Paul Bruckwicki

Welcome **AECOM**

Action Items

AECOM

- Provide a summary of nutrient data following fluidized bed reactor optimization. **In progress.** Initial update will be provided at the September MMM, where preliminary nutrient data and trend analysis will be provided. Action item will be updated.
- Plan 1,4-dioxane sampling. **In progress.** AECOM sampling planned for Fall (~October) including ~54 wells; looking at some additional wells down-gradient of those initially sampled round due to 1,4-dioxane propensity to migrate faster than associated solvent. Action item will be updated to include an action memo revision and a sampling plan.
- Send proposed LUC boundaries to Army for review immediately upon definition. **In progress.** The intent is to include the LUC boundaries for LHAAP-37, -46, -50, -58 and -67 in the Fall LUC Management Plan update. The LUC and recordation package will be sent to TCEQ for legal review.
- Provide boring log for temporary well 67DPT14 at site LHAAP-67 to Mr. Mayer. **Complete.**
- Provide Army with individual surface water sampling plans for discussion at next MMM, with group to discuss how best to incorporate this information into the record (e.g., append RACRs, etc.). **In progress.**
- Provide update on status of vault at LHAAP-67. **In progress.** AECOM will provide a schedule for the work.

Army

- USACE to provide technical direction for AECOM to address the LHAAP-67 vault. **Complete.**
- Provide update on latest LHAAP-37 Bioplug results. **Complete.** Discussed later in the meeting.

EPA

- Provide the Work Plan supporting EPA's contractor sampling event. **Complete.**

- Develop/coordinate with Army on a schedule for surface water drainage sampling. **Postponed until next spring.**

TCEQ

AEC

USFWS

Defense Environmental Restoration Program (DERP) PBR Update AECOM

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

Item 1 (GWTP Quarterly Report) – Comments received from EPA and TCEQ. 2nd Quarter 2014 report is in progress.

Item 2 (LHAAP-18/24 Revised FS) – Currently scheduled for submittal to agencies on October 31, 2014.

Item 3 (Completion Reports/Remedial Action Operation Reports) – RTCs being developed for agency comments on LHAAP-67 and LHAAP-58 RACRs. RACRs for LHAAP-46, LHAAP-50, and LHAAP-37 are also forthcoming. LHAAP-46 and LHAAP-67 will be the first RAO reports issued.

Item 4 (Monthly Managers' Meeting) – Next MMM scheduled for 10AM, Thursday, September 11th by teleconference.

Item 5 (GW Network Optimization Memos) – Optimization memos will be submitted with RACRs, so this tracker item will be combined with the "Completion Report/Remedial Action Operation Reports" item.

Item 6 (LHAAP-29 Fieldwork) – LHAAP-29 field work is anticipated to be complete by the end of the month. Mr. Wacker refreshed the group that CPT at LHAAP-29 was unsuccessful due to highly consolidated materials, so characterization has been done using hollow-stem auger drilling/field screening/analytical sampling. Refinement of the impacted groundwater plume area has been completed except to the west, which is underway. The extent of DNAPL is smaller than previously expected. Two additional borings will be completed at LHAAP-29, so demob from LHAAP-29 is expected in 5-7 days. Rig will then mobilize to LHAAP-18/24 to perform the additional drilling at the south corner.

Item 7 (LHAAP-17 PDI WP, LHAAP-16 RD WP, LHAAP-03 RD/RAWP, LHAAP-04 RD, LHAAP-47 RD) – Placeholder for sites on hold due to dispute.

Item 8 (RAB) – Scheduled for Thursday, August 7th at 6PM. Work at LHAAP-18/24 and LHAAP-29 will be discussed with a focus on explaining treatability studies being implemented. Preliminary DNAPL extent maps to be presented to the RAB for LHAAP-18/24 Unlined Evaporation Pond and Air Curtain Destructor areas were reviewed. The next RAB meeting will be proposed for Thursday, November 20th at 6PM.

Item 9 (GWTP O&M) – Normal maintenance is on-going. Perchlorate plan memo and GWTP sampling optimization memo are in progress.

Item 10 (Admin Record Update) – AR Updates for 1st and 2nd Quarter 2014 were very limited. They are being prepared and should be completed by the end of the month.

Item 11 – (Nutrient Issue for HB and INF) – Discussed earlier in meeting.

Item 12 – (Website) – TCEQ comments were received and Army feels those can be made. Mr. Mayer deferred to Ms. Palmie who did a more thorough review of the website content. The website will be announced tonight at the RAB meeting, a public notice will be published (Marshall and Shreveport newspapers) to inform the public about the availability of this website, an email reminder will be provided to the interested parties list, and an additional reminder will be sent with the next RAB meeting notification. EPA will place an announcement on the EPA Longhorn site.

Item 13 – (CRP/CIP) – Placeholder maintained in the tracker as a reminder that these requirements and recommendations are applicable to our work going forward.

Item 14 (LHAAP-12 RAO Report) – The RAO report and a memo proposing additional plume well installation in response to Five-Year Review report comments will be submitted to the agencies together.

Item 15 (Surface Water Sampling Approach) – Discussed earlier in the meeting.

Item 16 (1,4-Dioxane Sampling) – Discussed earlier in the meeting.

Defense Environmental Restoration Program (DERP) PBR Update (continued) AECOM

- Upcoming field work
  - EPA Sampling Event – Begins August 18th
  - LHAAP-29 continued intermediate zone characterization
  - LHAAP-18/24 additional well at south corner
  - Monitored Natural Attenuation sites groundwater sampling
- Monthly data – no submittal this month due to limited validated data receipt. May consider adding a figure to help explain where samples originate.
- Groundwater Treatment Plant
  - Chlorine leak occurred in an outbuilding associated with the water supply well at the Fire Station. One cylinder is known to have leaked and an additional cylinder is in very poor condition, and may have leaked. These two cylinders will be removed, along with three additional cylinders. A site visit for bidders was conducted yesterday and three contractors will be providing response plans and bids today. Planning and logistics of the removal action will be closely co-ordinated with USFWS.
  - Surface soils in the impacted area (dead grass) had pH levels of 5.1–5.4, as opposed to 6.2-6.9 in unimpacted background area. Two applications of a mild base solution have been made to restore pH. Post-treatment soil pH results were not immediately available.

MMRP Update Army

- Update – No new information

Other Environmental Restoration **Army**

- Vault at LHAAP-67 – AECOM will provide a schedule for the work. Vault water will be sampled prior to any other activities.
- Site 37 Bioplug – Army is awaiting 23 July 2014 sampling results expected at the end of August. These results will be evaluated to determine whether extension of the demonstration period is warranted.
- Surface Water Sampling Approach – discussed earlier in the meeting
- Website – public awareness – discussed earlier in the meeting
- Quarterly Reporting and Requirements
    - GWTP Evaluation with air monitoring data – Mr. Wacker indicated that the monthly air updates have been sent out earlier in the month than previously committed to.
    - Surface Water/Perimeter Well Quarterly Update – RAB handouts have the most recent data.
    - Administrative Record Update – discussed earlier in the meeting
- Annual Reporting
    - LUC Management Plan Update (due September 2014)
    - CRP/CIP Revision (Biennial) and questionnaire October 2015

Programmatic Issues **RM**

- Status of Dispute – No update on expected date of EPA Administrator's decision.
- Interim Path Forward - Army is evaluating moving forward with groundwater remedies at disputed sites as Non-Time Critical Removal Actions. Army's position is that the remedies themselves are not disputed, so Army should be able to move forward with agency concurrence.

USFWS Transfer Update **PB**

- USFWS is evaluating ECP VI. A key review staff member has retired.
- USFWS is still concerned about 2 fill pipes in LHAAP-46 that may represent some type of tank. Although the Army believes these are related to electrical conduit USFWS would like these opened to confirm.
- USFWS observed a sump at a building near the INF Pond and wondered if it had historically been addressed.

Schedule Next Managers' Meeting – Thursday, September 11th at 10AM, by teleconference.

New Action Items

AECOM

- Add current field activities to the website calendar.
- Combine Document and Issue Tracker Item 5 with Item 3.
- Review as-builts of the LHAAP-29 area available from USFWS.
- Review Five-Year Review report comments on LHAAP-12 wells to ensure well recommendation addresses all issues.
- Provide public notice language for website to EPA

Army

EPA

- Clarify Ms. Coats' request for additional LHAAP information to be provided to the public.

- Provide opinion on whether EPA concurs that groundwater remedies at disputed sites are not in dispute, and EPA would not object to Army implementing groundwater remedies as non-time critical removal actions at those sites.
- Provide an update on the status of EPA's development of perchlorate action levels.

Adjourn

ACRONYM LIST

AEC	**United States Army Environmental Command**
AECOM	**AECOM Technology Services, Inc.**
AP	**April Palmie**
AR	**Administrative Record**
BERA	**Baseline Ecological Risk Assessment**
BRAC	**Base Realignment and Closure**
CPT	**Cone Penetration Testing**
CRP/CIP	**Community Relations Plan/Community Involvement Plan**
DERP	**Defense Environmental Restoration Program**
DNAPL	**Dense Non-Aqueous Phase Liquid**
ECP	**Environmental Condition of Property**
EPA	**United States Environmental Protection Agency**
FS	**Feasibility Study**
GWTP	**Ground Water Treatment Plant**
HB	**Harrison Bayou**
INF	**Intermediate-Range Nuclear Forces**
LHAAP	**Longhorn Army Ammunition Plant**
LUC	**Land Use Control**
MMM	**Monthly Managers' Meeting**
MMRP	**Military Munitions Response Program**
O&M	**Operation and Maintenance**
PB	**Paul Bruckwicki**
PBR	**Performance-Based Remediation**
PDI	**Pre-Design Investigation**
RAB	**Restoration Advisory Board**
RACR	**Remedial Action Completion Report**
RAO	**Remedial Action Operation**
RAWP	**Remedial Action Work Plan**
RD	**Remedial Design**
RM	**Rich Mayer**
RMZ	**Rose M. Zeiler**
RTC	**Response to Comments**
TCEQ	**Texas Commission on Environmental Quality**
USACE	**United States Army Corps of Engineers**
USFWS	**United States Fish and Wildlife Service**
USGS	**United States Geological Service**
WP	**Work Plan**

Subject:	**Final Minutes, Monthly Managers' Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Teleconference – 866-203-6896, passcode 1759304791**
Date of Meeting:	**September 11, 2014 – 10:00 AM**

Attendees:

Army BRAC:	Rose Zeiler
EPA:	Rich Mayer, Kent Becher (USGS Liaison), Barry Forsythe (USFWS Liaison)
TCEQ:	April Palmie
USACE:	Aaron Williams, Rick Smith
AECOM:	Dave Wacker, Gretchen McDonnell, Josh Miller
AEC:	
USFWS:	Paul Bruckwicki

Welcome **AECOM**

Action Items
AECOM

- Provide initial update for fluidized bed reactor optimization at the September MMM, including preliminary nutrient data and trend analysis. **In progress.** Nutrient data is planned for submittal on September 18th.
- Develop revised 1,4-dioxane sampling memo and sampling plan for Fall event. **In progress.** Previous event was in May (spring), so a November (fall) sampling is planned to capture seasonal variation.
- Send proposed LUC boundaries to Army for review immediately upon definition. **In progress.** LUC boundary maps for LHAAP-46 and LHAAP-67 have been provided to EPA and TCEQ for review.
- Provide Army with individual surface water sampling plans for discussion at next MMM, with group to discuss how best to incorporate this information into the record (e.g., append RACRs, etc.). **Complete.**
- Provide schedule for LHAAP-67 vault decommissioning work. **In progress.** Water sample will be collected tomorrow, with demolition to occur on October 15th .
- Add current field activities to the website calendar. **Pending**.
- Combine Document and Issue Tracker Item 5 with Item 3. **Complete.**
- Review as-builts of the LHAAP-29 area available from USFWS. **Pending.**
- Review Five-Year Review report comments on LHAAP-12 wells to ensure well recommendation addresses all issues. **Complete.**
- Provide public notice language for website to EPA. **Complete.**

Army

EPA

- Clarify Ms. Coats' request for additional LHAAP information to be provided to the public. **Complete.** The concern that the website was available to the public. AECOM updated that the website is active, notice was published in Shreveport and Marshall papers and notification sent to RAB members and interested parties.

- Provide opinion on whether EPA concurs that groundwater remedies at disputed sites are not in dispute, and EPA would not object to Army implementing groundwater remedies as non-time critical removal actions at those sites. **Complete.** Dr. Zeiler retracted the first part of the question as Army Legal has clarified that Army can move forward on undisputed groundwater remedies at LHAAP-16 and LHAAP-47 using an Action Memorandum, upon which the agencies can provide comment/concurrence. Dr. Zeiler asked for any suggestions from EPA and TCEQ on how to go through the process and what is required for formal concurrence with an Action Memorandum. Mr. Mayer stated that, generally speaking, EPA should not have a problem with Army moving forward on undisputed portions of the remedy.
- Provide an update on the status of EPA's development of perchlorate action levels. **In progress.** Mr. Mayer is waiting for a return call on his inquiry.
- Develop/coordinate with Army on a schedule for surface water drainage sampling. **Postponed until next spring.**

TCEQ

AEC

USFWS

Defense Environmental Restoration Program (DERP) PBR Update AECOM

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

Item 1 (GWTP Quarterly Report) – 2nd Quarter 2014 report is in progress and is planned for submittal by the end of the month. An optimization of the current Sampling Plan in accordance with the interim Record of Decision and subsequent agreements in progress.

Item 2 (LHAAP-18/24 Revised FS) – Revised schedule provided today with modified submittal date of December 31, 2014. Field effort is wrapping up. Initial treatability study results indicate ISB and ZVI is working well for the 18/24 material being tested, while emulsified ZVI is not working well. Good treatability study information is being developed for incorporation in the Revised FS.

Item 3 (Completion Reports/Remedial Action Operation Reports)

LHAAP-37, 46 and 50 – Drafts are being finalized and will be submitted for agency review shortly. LHAAP-37 has a planned submittal date of September 19th, but the remainder should be submitted around that time as well. For LHAAP-37, TCEQ's email providing comment on the installation of additional DPTs and a well has been received, and AECOM is evaluating it. Further conversation was tabled until the next MMM.

LHAAP-58: Finalizing RTCs on agency comments.

LHAAP-67: RTCs submitted to agencies on August 28th, with the plan to get those comments resolved while we are waiting on the Appendix A LUC boundary survey and recordation documents to be added. The document will proceed to draft final status when the Appendix A materials are incorporated.

Proposed LUC boundary maps for LHAAP-46 and LHAAP-67 have been submitted for agency concurrence. Once concurrence is received, survey will be initiated. Proposed LUC boundary maps for LHAAP-50, LHAAP-58 and LHAAP-37 are in progress.

See additional LHAAP-46 dry wells discussion in **Defense Environmental Restoration Program (DERP) PBR Update** section below.

LHAAP-46 and LHAAP-67 will be the first RAO reports issued. These will be going to Army the first part of next week.

Item 4 (Monthly Managers' Meeting) – Next MMM scheduled for 10AM, Tuesday, October 14th, by teleconference. The November meeting has already been set for November 20th to match the RAB meeting date.

Item 5 (LHAAP-29 Fieldwork and Revised FS) – Mr. Wacker emailed a summary for LHAAP-29 field findings and supporting field draft figures to the group during the call. The extent of DNAPL is smaller than previously expected. Refinement of the significantly impacted groundwater plume area has been completed except to the west, which is expected to be completed with the installation of one additional boring. Mr. Mayer stated that their laboratory commented that the recent EPA groundwater sample from 29WW16 contained a high concentration of TCE, which would be unexpected based on historical results showing methylene chloride as the contaminant of concern; however, actual lab results have not yet been received at this time.

Item 6 (LHAAP-17 PDI WP, LHAAP-16 RD WP, LHAAP-03 RD/RAWP, LHAAP-04 RD, LHAAP-47 RD) – Placeholder for sites on hold due to dispute.

Item 7 (RAB/Website) – Next RAB scheduled for Thursday, November 20th at 6PM. Focus will be 18/24 and 29 completed efforts and data. EPA may have results of their groundwater sampling event to present. A few supportive comments were received by AECOM after the website roll-out. Mr. Wacker stated that the calendar on the website will be updated to reflect upcoming field activities as they are planned. The EPA sampling event was added to that schedule.

Item 8 (GWTP O&M) – Normal maintenance is on-going. Winterization activities are in progress. Perchlorate plan memo and GWTP sampling optimization memo are in progress.

Item 10 (Admin Record Update) – AR Updates for 1st and 2nd Quarter 2014 should be transmitted by the end of the week.

Item 11 – (Nutrient Issue for HB and INF) – Data will be provided to the group by September 19th as discussed earlier in the meeting.

Item 12 – (CRP/CIP) – Placeholder maintained in the tracker as a reminder that these requirements and recommendations are applicable to our work going forward.

Item 13 (LHAAP-12 RAO Report (2012/2013) and Additional Proposed Well) – A memo proposing a path forward to address TCEQ's 2012 Five-Year review comment asking for installation of an additional plume well has been submitted to the agencies for concurrence. As background for the discussion, Dr. Zeiler stated that deeper wells were installed at LHAAP-12, including 12WW20 inside the plume boundary, because of declining water levels, but the agencies commented that the wells were installed too deep to monitor the impacted shallow zone. Army then installed a shallower well (12WW24) inside the plume boundary. At that time, significant work was done to examine cross-sections, water levels, etc. to try to determine the appropriate lithology to target for monitoring. Dr. Zeiler provided to the group an email with an attachment containing excerpted TCEQ comments from the April 2007 well abandonment and installation report,

illustrating the historical discussion and providing background to facilitate discussion (bate stamp 00043930). Mr. Wacker stated he would send the full document to the group by SendFiles.

Ms. McDonnell stated that an exploratory boring had been installed at the proposed 12WW25 location (50 feet east of impacted well 12WW24), a groundwater sample collected, and analytical results are expected today to indicate whether that location is within the plume. Moisture was encountered at 21' bgs, with wet materials at 25' bgs. The sand sequence of interest (containing impacts) appears to be present from 15'-30' bgs, but only the 25'-30' portion appears to have enough moisture to produce water for sampling at this time.

Item 14 (1,4-Dioxane Sampling) – Discussed earlier in the meeting.

Defense Environmental Restoration Program (DERP) PBR Update (continued) AECOM

- Upcoming field work
  - EPA Sampling Event – Begins August 18th
  - LHAAP-29 continued intermediate zone characterization
  - LHAAP-18/24 additional well at south corner
  - Monitored Natural Attenuation sites groundwater sampling
- Monthly data – data submittal provided prior to the meeting. May consider adding a figure to help explain where samples originate.
  - Mr. Mayer asked if Army has a database system where comprehensive data can be reviewed more easily. AECOM has a comprehensive database of laboratory data, but no database for electronic viewing of comprehensive site data. Items such as logs and construction forms are accessed manually by reviewing electronic copies of the historical reports.
- Groundwater Treatment Plant
  - Direct-read perchlorate probe has been purchased to help detect higher concentrations of perchlorate in the treated water.
  - Additional granulated activated carbon has been added to the fluidized bed reactor and will continue to be periodically added to maintain bed height.
- LHAAP-46 Dry Well Discussion - Ms. McDonnell led a discussion explaining the construction of shallow zone wells with respect to dry well conditions and implications for plume delineation.
  - A table providing construction and lithology information for LHAAP-46 wells installed as part of the remedial action was provided to the group shortly before the meeting, and was referenced throughout the discussion
  - Discussions regarding persistent drought conditions resulting in dry shallow zone wells at LHAAP-46 have been discussed periodically over the last 18 months.
  - Because some of the shallow zone plume delineation is completed with these dry wells, an examination of the well construction is warranted to establish whether 1) the wells are fully-penetrating and indicate a true lack of water in the zone or 2) there may be water in the shallow zone at the dry well locations, but wells were completed too shallowly to intersect it.
  - The premise is that fully-penetrating wells are valid compliance/delineation points when dry, as a lack of water in the shallow zone indicates no current ability for contaminant transport. The information discussed provided the basis for confirmation that key delineation wells (e.g., 46WW12, 46WW13, 46WW15) installed during the remedial action are fully-penetrating wells terminating in the

bottom of the shallow zone and, as such, are valid delineation points for the shallow zone even when dry.

- Mr. Mayer asked how the bottom of the shallow zone was defined. Ms. McDonnell stated that notes on the well construction and lithology information table help to define it. Dr. Zeiler summarized that the agencies had previously asked Shaw to review/reclassify all the groundwater monitoring wells with respect to hydrogeology, with all parties coming to agreement on what constituted "shallow", "intermediate" and "deep" for the sites. Ms. McDonnell cited notes 1 and 2 on the table as describing the outcome of the reclassification effort where wells with total depths less than ~30 feet were classified as "shallow", establishing the bottom of the shallow zone to be ~30 feet bgs depending upon variations in surface topography. Wells with total depths between ~37 and ~48 feet were designated as intermediate, establishing the top of the intermediate zone as ~27-38' bgs (assuming typical 10-foot screened intervals).
- The evaluation of whether the dry wells are fully-penetrating, these classifications have been considered, along with the lithology observed in the well borings.
- Mr. Mayer asked if the shallow zone wells currently with water tend to be screened deeper than the dry wells. Ms. McDonnell answered that there are two different situations we are seeing due to two different generations of wells:1) those installed prior to the remedial action and 2) those installed as part of the remedial action. Dry wells from the group installed prior to the remedial action appear often to not be fully-penetrating the shallow zone aquifer, and may be simply installed too shallowly to intercept water at the bottom of the shallow zone. Conversely, dry wells installed during the remedial action do fully-penetrate the shallow zone aquifer, indicating the absence of water in the shallow zone at those locations.
- Ms. McDonnell's stated that review of boring logs suggest that, in the areas with dry fully-penetrating shallow zone wells on the east side of the site, there is less clay/more sand in the interval between "shallow" and "intermediate" which may work to allow downward passage of infiltration from the shallow zone into the intermediate, instead of water being retained at the bottom of a creating a zone of shallow groundwater to be tapped by the shallow wells
- Mr. Mayer asked whether there is a true separation between the shallow and intermediate zone. Ms. McDonnell stated that the lithology across the site is variable due to depositional environment but, in locations where the lithology is not all clay from top to bottom, there does appear to be an identifiable clay layer separating shallow and intermediate zones.
- Mr. Mayer asked if any of the intermediate zone wells are dry. Ms. McDonnell stated that one of the older intermediate zone wells is dry. The well is screened at an appropriate depth, so the reason for the well's dry condition is unknown. The remainder of the intermediate zone wells are producing water.
- Ms. Palmie asked if any of the existing shallow wells at the site are not part of the monitoring network. Ms. McDonnell stated that there are some wells that are not part of the current MNA monitoring plan.
- Ms. McDonnell stated that the critical point of this discussion is that the new fully-penetrating wells that are currently dry (46WW12, 46WW13, 46WW15) located on the down-gradient/east side, will continue to be gauged during quarterly monitoring events, so if water returns to the zone (and with it the potential to transport contaminants), we will know that and we will be able to collect a sample because those wells are there as sentries.

- Mr. Mayer asked what the last analytical results were for wells on the down-gradient/east side, such as LHSMW24 and LHSMW27, that are currently dry. Mr. Williams stated that the last sampling dates of LHSMW24 and LHSMW27 from 1994-1998 showed TCE at less than the detection level of 5 micrograms per liter. Ms. Palmie asked if those wells were fully-penetrating. Ms. McDonnell will provide the final sampling results for LHSMW24 and LHSMW27, along with an evaluation of whether those wells are fully-penetrating and the list of wells included in the groundwater monitoring plan for LHAAP-46.

- LHAAP-12 RAO Comments – discussed earlier in the meeting

MMRP Update **Army**

- Update – No new information

Other Environmental Restoration **Army**

- Vault at LHAAP-67 – Discussed earlier in the call. AECOM will sample the water in the vault on September 15th with demo planned for October 15th.
- Site 37 Bioplug – Dr. Zeiler emailed July 2014 sampling results to the group during the meeting. Mr. Williams has transmitted the data to the USACE Center of Excellence (CX). Futher update will be provided after CX review. These results will be evaluated to determine whether extension of the demonstration period is warranted.
- Surface Water Sampling Approach – discussed earlier in the meeting
- Website – public awareness – discussed earlier in the meeting
- Quarterly Reporting and Requirements
  - GWTP Evaluation with air monitoring data – Mr. Wacker will be checking with Mr. Salameh on the status of the monthly air memo.
  - Surface Water/Perimeter Well Quarterly Update – Sampling is scheduled for October.
  - Administrative Record Update – discussed earlier in the meeting
- Annual Reporting
  - LUC Management Plan Update (due September 2014) – USACE has drafted a version with some additions. Update of the document will be delayed in an attempt to include new LUC boundaries for LHAAP-46 and LHAAP-67.
  - CRP/CIP Revision (Biennial) and questionnaire October 2015

Programmatic Issues **RM**

- Status of Dispute – A meeting between EPA Headquarters staff and the EPA Administrator has been rumored. No update on expected date of EPA Administrator's decision.
- Interim Path Forward – Discussed earlier in the meeting.

USFWS Transfer Update **PB**

- Environmental Restoration Issues with Transfer Schedule Impact – None
- USFWS Comments on Documents – None
- USFWS Real Estate in Albuquerque continues to evaluate ECP VI documents. Mr. Bruckwicki reported that the USFWS Real Estate department has been gutted with retirements and other departures. No update on schedule for the ECP VI acceptance, except that those documents will be processed as soon as possible.

Schedule Next Managers' Meeting – Tuesday, October 14th at 10AM, by teleconference.

New Action Items

AECOM

- Begin preparing Action Memorandums for LHAAP-16 and LHAAP-47. Army will provide further guidance on format.
- Examine the level of effort required to develop a comprehensive geospatial database of all information for LHAAP (lab data, boring logs, well construction reports, etc.) that will make review easier.
- To support agency evaluation of the proposed LHAAP-46 LUC boundary, Ms. McDonnell will provide to the agencies: 1) most recent sampling results for LHSMW24 and LHSMW27; 2) an evaluation of whether LHSMW24 and LHSMW27 are fully-penetrating wells; and, 3) the list of wells included in the groundwater monitoring plan for LHAAP-46.
- Provide the LHAAP-12 April 2007 well abandonment and installation report to the MMM group by SendFiles.

Army

- Confer with AECOM on development of an electronic database.

EPA

- Dr. Zeiler asked for any suggestions from EPA and TCEQ on what will be required for them to provide concurrence with Action Memorandums for sites like LHAAP-16 and LHAAP-47 where Army intends to move forward with groundwater remedies in the absence of a signed Record of Decision.

TCEQ

Adjourn

Attachment: LHAAP Data Validated May - August 2014

-GWTP Influent and Effluent
-LHAAP-18/24 Semi-Annual Groundwater Monitoring Event
-LHAAP35B (37) Remedial Action Field Work Sampling
-LHAAP-46 Remedial Action Field Work Sampling
-LHAAP-50 Quarterly MNA Groundwater Monitoring Event
-LHAAP-50 Remedial Action Field Work Sampling
-LHAAP-58 Quarterly MNA Groundwater Monitoring Event
-LHAAP-67 Quarterly MNA Groundwater Monitoring Event
-LHAAP-67 Remedial Action Sampling

ACRONYM LIST

AEC	**United States Army Environmental Command**
AECOM	**AECOM Technology Services, Inc.**
AP	**April Palmie**
AR	**Administrative Record**
bgs	**below ground surface**
BRAC	**Base Realignment and Closure**
CRP/CIP	**Community Relations Plan/Community Involvement Plan**
CX	**Center of Excellence**
DERP	**Defense Environmental Restoration Program**
DNAPL	**Dense Non-Aqueous Phase Liquid**
ECP	**Environmental Condition of Property**
EPA	**United States Environmental Protection Agency**
FS	**Feasibility Study**
GWTP	**Ground Water Treatment Plant**
HB	**Harrison Bayou**
INF	**Intermediate-Range Nuclear Forces**
ISB	**In-Situ Bioremediation**
LHAAP	**Longhorn Army Ammunition Plant**
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RMZ	**Rose M. Zeiler**
RTC	**Response to Comments**
TCE	**Trichloroethene**
TCEQ	**Texas Commission on Environmental Quality**
USACE	**United States Army Corps of Engineers**
USFWS	**United States Fish and Wildlife Service**
USGS	**United States Geological Service**
WP	**Work Plan**
ZVI	**Zero-Valent Iron**

LHAAP Data Validated
August 2014

GWTP Influent and Effluent

Weekly, Biweekly, Monthly and Quarterly - March through June 2014

Ammonia (350.1)
Nitrogen (353.2)
Ortho-Phosphate (365.2)
Chemical Oxygen Demand (410.4)
Total Organic Carbon (415.1)
Oil & Grease (1664A)
Metals (6010C)
Metals (6020A)
Perchlorate (6850)
Hexavalent Chromium (7196A)
VOC (8260B)
Inorganic Anions (9056)

Site 18/24

Semi-Annual Sampling
June 2014
VOC (8260B)
Perchlorate (6850)
Metals (6010C and 6020A)
Mercury (7470A)

Site 37

Remedial Action Field Work
May 2014, July 2014
VOC (8260B)

Site 46

Remedial Action Field Work
May 2014, July 2014
VOC (8260B)

Site 50

Quarterly MNA Sampling
March, 2014, June 2014
Total Alkalinity (310.2)
Phosphorus (365.4)
Sulfide (376.1)
Total Organic Carbon (415.1)
Metals (6010C)
Metals (6020A)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gasses (RSK-175)
Perchlorate (6850)

Remedial Action Field Work
May 2014
VOC (8260B)

Site 58

Quarterly MNA Sampling
May 2014
Total Alkalinity (310.2)
Phosphorus (365.4)
Sulfide (376.1)
Total Organic Carbon (415.1)
Metals (6010C and 6020A)
Ferrous Iron (SM3500FE)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gasses (RSK-175)
Volatile Fatty Acids (830-MBA)

Site 67

Quarterly MNA Sampling
May 2014
Sulfide (376.1)
Total Organic Carbon (415.1)
VOC (8260B)
Inorganic Anions (9056)
Dissolved Gasses (RSK-175)
Ferrous Iron (SM3500FE)

Remedial Action Field Work
June 2014
VOC (8260B)

LHAAP GWTP Effluent - Weekly Sampling
April/May 2014

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6165-GRAB 4/10/2014	LH18/24-SP650-6167-GRAB 4/21/2014	LH18/24-SP650-6170-GRAB 4/28/2014	LH18/24-SP650-6172-GRAB 5/5/2014	LH18/24-SP650-6174-GRAB 5/12/2014	LH18/24-SP650-6176-GRAB 5/19/2014	LH18/24-SP650-6178-GRAB 5/27/2014
ID Location:			GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly
Ammonia (350.1)									
AMMONIA AS N	mg/L		3.96	3.69	3.71	4.66	4.27	3.78	4.35
Nirtrogen (353.2)									
NITROGEN, NITRATE-NITRITE	mg/L		N/A	N/A	N/A	N/A	N/A	0.099 J	N/A
Ortho-Phosphate (365.2)									
ORTHO-PHOSPHATE	mg/L		0.728	0.495	0.471	0.476	0.65	0.737	0.805
Total Organic Carbon (415.1)									
TOTAL ORGANIC CARBON (TOC)	mg/L		113	59.4	70.5	50	57.8	39.3	50.1
Perchlorate (6850)									
PERCHLORATE	ug/L	13	<0.2 U	<0.2 U	<0.2 U	<0.2 U	9.15	<0.2 U	<0.2 U

Blue Highlighting Indicates concentrations above the Daily Maximum Concentration

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

LHAAP GWTP Effluent - Biweekly Sampling
March/April/May 2014

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6163-COMP 3/31/2014	LH18/24-SP650-6163-GRAB 3/31/2014	LH18/24-SP650-6166-COMP 4/14/2014	LH18/24-SP650-6166-GRAB 4/14/2014	LH18/24-SP650-6169-COMP 4/28/2014	LH18/24-SP650-6169-GRAB 4/28/2014	LH18/24-SP650-6173-COMP 5/15/2014	LH18/24-SP650-6173-GRAB 5/15/2014	LH18/24-SP650-6177-COMP 5/27/2014	LH18/24-SP650-6177-GRAB 5/27/2014
ID Location:			GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly
Metals (6010C)												
SELENIUM	mg/L	0.012	N/A	N/A	N/A	N/A	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 UJ
Metals (6020A)												
LEAD	mg/L	0.0046	<0.001 U	<0.001 U	0.00105 J	0.00117 J	<0.001 U	<0.001 U	0.001	0.001	<0.001 U	<0.001 U
SELENIUM	mg/L	0.012	0.00838	0.00866	0.0133	0.0132	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	mg/L	0.003	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	0.001	0.001	<0.001 U	<0.001 U
Perchlorate (6850)												
PERCHLORATE	ug/L	13	25.3	8.9	<0.2 U	<0.2 U	<0.2 U	<0.2 U	550	850	<0.2 U	<0.2 U
Hexavalent Chromium (7196A)												
HEXAVALENT CHROMIUM	mg/L	0.124	<0.01 U	<0.01 U	0.00666 J	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Volatile Organic Compounds (8260B)												
1,1,1,2-TETRACHLOROETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	7230	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	216.9	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,1-DICHLOROETHANE	ug/L	14032	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
1,1-DICHLOROETHENE	ug/L	253	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
1,1-DICHLOROPROPENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		N/A	<0.3 U	N/A	<0.3 U	N/A	<0.3 U	N/A	<0.3 U	N/A	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
1,2,4-TRICHLOROBENZENE	ug/L		N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L		N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	<2 U
1,2-DIBROMOETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,2-DICHLOROBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
1,2-DICHLOROETHANE	ug/L	181	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,2-DICHLOROPROPANE	ug/L		N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,3-DICHLOROBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
1,3-DICHLOROPROPANE	ug/L		N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U
1,4-DICHLOROBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
2,2-DICHLOROPROPANE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
2-BUTANONE	ug/L		N/A	<5 U	N/A	<5 U	N/A	<5 U	N/A	<5 U	N/A	<5 U
2-CHLOROTOLUENE	ug/L		N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
2-HEXANONE	ug/L		N/A	<5 U	N/A	<5 U	N/A	<5 U	N/A	<5 U	N/A	<5 UJ
4-CHLOROTOLUENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
4-METHYL-2-PENTANONE	ug/L		N/A	<5 U	N/A	<5 U	N/A	<5 U	N/A	<5 U	N/A	<5 U
ACETONE	ug/L	2395	N/A	3.92 J	N/A	4.68 J	N/A	<5 U	N/A	2.59	N/A	3.57 J
BENZENE	ug/L	181	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
BROMOBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
BROMOCHLOROMETHANE	ug/L		N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U
BROMODICHLOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
BROMOFORM	ug/L		N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
BROMOMETHANE	ug/L		N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
CARBON DISULFIDE	ug/L		N/A	3.95	N/A	<1 U	N/A	0.73 J	N/A	0.773 J	N/A	<1 U

LHAAP GWTP Effluent - Biweekly Sampling
March/April/May 2014

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6163-COMP 3/31/2014	LH18/24-SP650-6163-GRAB 3/31/2014	LH18/24-SP650-6166-COMP 4/14/2014	LH18/24-SP650-6166-GRAB 4/14/2014	LH18/24-SP650-6169-COMP 4/28/2014	LH18/24-SP650-6169-GRAB 4/28/2014	LH18/24-SP650-6173-COMP 5/15/2014	LH18/24-SP650-6173-GRAB 5/15/2014	LH18/24-SP650-6177-COMP 5/27/2014	LH18/24-SP650-6177-GRAB 5/27/2014
ID Location:			GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly
CARBON TETRACHLORIDE	ug/L	181	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
CHLOROBENZENE	ug/L	47180	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
CHLOROETHANE	ug/L		N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
CHLOROFORM	ug/L	3615	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
CHLOROMETHANE	ug/L		N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
CIS-1,2-DICHLOROETHENE	ug/L		N/A	1.19	N/A	1.85	N/A	1.53	N/A	1.23	N/A	1.4
CIS-1,3-DICHLOROPROPENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
DIBROMOCHLOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
DIBROMOMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 UJ	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
ETHYLBENZENE	ug/L	57025	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
HEXACHLOROBUTADIENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
ISOPROPYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
M,P-XYLENE	ug/L	83.6	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
METHYLENE CHLORIDE	ug/L	1699	N/A	<0.5 U	N/A	<0.5 U	N/A	0.26 J	N/A	0.5	N/A	0.281 J
NAPHTHALENE	ug/L		N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 UJ
N-BUTYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
N-PROPYLBENZENE	ug/L		N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
O-XYLENE	ug/L	83.6	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
SEC-BUTYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
STYRENE	ug/L	5987	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U
TERT-BUTYLBENZENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
TETRACHLOROETHENE	ug/L	180.7	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
TOLUENE	ug/L	4189	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U
TRICHLOROETHENE	ug/L	181	N/A	1.32	N/A	1.28	N/A	1.23	N/A	1.55	N/A	1.48
TRICHLOROFLUOROMETHANE	ug/L		N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
VINYL CHLORIDE	ug/L	72	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U
Inorganic Anions (9056)												
CHLORIDE	mg/L		649	639	691	378	627	643	1320	N/A	528	576
SULFATE	mg/L		158	185	164	162	115	166	92.7	64.3	47.8	38.9

Blue Highlighting Indicates concentrations above the Daily Maximum Concentration

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP GWTP Effluent - Monthly Sampling
May/June 2014

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6171-GRAB 5/5/2014	LH18/24-SP650-6179-GRAB 6/2/2014
ID Location:			GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Monthly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Monthly
Metals (6010C)				
ALUMINUM	mg/L	1.644	0.0811 J	<0.1 U
IRON	mg/L	2.395	0.136 J	0.0655 J
SELENIUM	mg/L	0.012	<0.01 U	<0.01 U
Metals (6020A)				
ANTIMONY	mg/L		<0.001 U	<0.001 U
ARSENIC	mg/L	0.772	0.00231	0.00202
BARIUM	mg/L	2	0.147	0.124
CADMIUM	mg/L	0.0034	<0.0006 U	<0.0006 U
CHROMIUM	mg/L	0.752	0.00406	0.00464
COBALT	mg/L	11.495	0.000712 J	0.00054 J
LEAD	mg/L	0.0046	<0.001 U	<0.001 U
MANGANESE	mg/L	15.494	0.0928	0.0451
NICKEL	mg/L	0.184	0.00287 J	0.00262 J
SELENIUM	mg/L	0.012	N/A	N/A
SILVER	mg/L	0.003	<0.001 U	<0.001 U
THALLIUM	mg/L		<0.0002 U	<0.0002 U
VANADIUM	mg/L	3.592	0.000973 J	0.000588 J
ZINC	mg/L	0.31	0.0138 J	<0.025 U
Perchlorate (6850)				
PERCHLORATE	ug/L	13	N/A	N/A

Blue Highlighting Indicates concentrations above the Daily Maximum Concentration

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

LHAAP GWTP Influent - Monthly Sampling
April/May/June 2014

Location ID: Sample Date:	Units	LH18/24-SP140-7164-GRAB 4/10/2014	LH18/24-SP140-7171-GRAB 5/5/2014	LH18/24-SP140-7179-GRABDL01 6/2/2014
ID Location:		GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly	GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly	GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly
Metals (6010C)				
ALUMINUM	mg/L	0.0924 J	N/A	N/A
IRON	mg/L	0.308	N/A	N/A
SELENIUM	mg/L	N/A	N/A	N/A
Metals (6020A)				
ANTIMONY	mg/L	0.00119 J	N/A	N/A
ARSENIC	mg/L	0.0107	N/A	N/A
BARIUM	mg/L	0.529	N/A	N/A
CADMIUM	mg/L	<0.0006 U	N/A	N/A
CHROMIUM	mg/L	0.00893	N/A	N/A
COBALT	mg/L	0.00444	N/A	N/A
LEAD	mg/L	<0.001 U	N/A	N/A
MANGANESE	mg/L	0.202	N/A	N/A
NICKEL	mg/L	0.0235	N/A	N/A
SELENIUM	mg/L	0.0412	N/A	N/A
SILVER	mg/L	<0.001 U	N/A	N/A
THALLIUM	mg/L	<0.0002 U	N/A	N/A
VANADIUM	mg/L	0.00116 J	N/A	N/A
ZINC	mg/L	0.0381 J	N/A	N/A
Perchlorate (6850)				
PERCHLORATE	ug/L	16300	14400	15400
Volatile Organic Compounds (8260B)				
1,1,1,2-TETRACHLOROETHANE	ug/L	<25 U	<12.5 U	<25 U
1,1,1-TRICHLOROETHANE	ug/L	<25 U	<12.5 U	<25 U
1,1,2,2-TETRACHLOROETHANE	ug/L	<20 U	<10 U	<20 U
1,1,2-TRICHLOROETHANE	ug/L	<25 U	<12.5 U	<25 U
1,1-DICHLOROETHANE	ug/L	<12.5 U	10 J	<12.5 U
1,1-DICHLOROETHENE	ug/L	59.5 J	90.3	94.1 J
1,1-DICHLOROPROPENE	ug/L	<25 U	<12.5 U	<25 U
1,2,3-TRICHLOROBENZENE	ug/L	<15 U	<7.5 U	<15 U
1,2,3-TRICHLOROPROPANE	ug/L	<50 U	<25 UJ	<50 U
1,2,4-TRICHLOROBENZENE	ug/L	<20 U	<10 U	<20 U
1,2,4-TRIMETHYLBENZENE	ug/L	<25 U	<12.5 U	<25 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	<100 U	<50 UJ	<100 UJ
1,2-DIBROMOETHANE	ug/L	<25 U	<12.5 U	<25 U
1,2-DICHLOROBENZENE	ug/L	<12.5 U	<6.26 U	<12.5 U
1,2-DICHLOROETHANE	ug/L	37.1 J	71.2	61.8
1,2-DICHLOROPROPANE	ug/L	<20 U	<10 U	<20 U
1,3,5-TRIMETHYLBENZENE	ug/L	<25 U	<12.5 U	<25 U

LHAAP GWTP Influent - Monthly Sampling
April/May/June 2014

Location ID: Sample Date:	Units	LH18/24-SP140-7164-GRAB 4/10/2014	LH18/24-SP140-7171-GRAB 5/5/2014	LH18/24-SP140-7179-GRABDL01 6/2/2014
ID Location:		GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly	GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly	GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly
1,3-DICHLOROBENZENE	ug/L	<25 U	<12.5 U	<25 U
1,3-DICHLOROPROPANE	ug/L	<20 U	<10 U	<20 U
1,4-DICHLOROBENZENE	ug/L	<12.5 U	<6.26 U	<12.5 U
2,2-DICHLOROPROPANE	ug/L	<25 U	<12.5 U	<25 U
2-BUTANONE	ug/L	<250 UJ	<125 U	<250 UJ
2-CHLOROTOLUENE	ug/L	<12.5 U	<6.26 U	<12.5 U
2-HEXANONE	ug/L	<250 UJ	<125 U	<250 UJ
4-CHLOROTOLUENE	ug/L	<25 U	<12.5 U	<25 U
4-METHYL-2-PENTANONE	ug/L	<250 UJ	<125 U	<250 U
ACETONE	ug/L	<250 UJ	<125 U	<250 U
BENZENE	ug/L	<12.5 U	23.9 J	<12.5 U
BROMOBENZENE	ug/L	<12.5 U	<6.26 U	<12.5 U
BROMOCHLOROMETHANE	ug/L	<20 U	<10 U	<20 U
BROMODICHLOROMETHANE	ug/L	<25 U	<12.5 U	<25 U
BROMOFORM	ug/L	<50 U	<25 UJ	<50 U
BROMOMETHANE	ug/L	<50 U	<25 U	<50 U
CARBON DISULFIDE	ug/L	<50 U	<25 U	<50 U
CARBON TETRACHLORIDE	ug/L	<25 U	<12.5 U	<25 U
CHLOROBENZENE	ug/L	<12.5 U	<6.26 U	<12.5 U
CHLOROETHANE	ug/L	<50 U	<25 U	<50 U
CHLOROFORM	ug/L	12.8 J	19.1 J	20 J
CHLOROMETHANE	ug/L	<50 UJ	<25 UJ	<50 UJ
CIS-1,2-DICHLOROETHENE	ug/L	3070	6950	6170
CIS-1,3-DICHLOROPROPENE	ug/L	<25 U	<12.5 U	<25 U
DIBROMOCHLOROMETHANE	ug/L	<25 U	<12.5 U	<25 U
DIBROMOMETHANE	ug/L	<25 U	<12.5 U	<25 U
DICHLORODIFLUOROMETHANE	ug/L	<25 UJ	<12.5 U	<25 U
ETHYLBENZENE	ug/L	<25 U	<12.5 U	<25 U
HEXACHLOROBUTADIENE	ug/L	<25 U	<12.5 U	<25 U
ISOPROPYLBENZENE	ug/L	<25 U	<12.5 U	<25 U
M,P-XYLENE	ug/L	<50 U	<25 U	<50 U
METHYLENE CHLORIDE	ug/L	3340	8170	12600
NAPHTHALENE	ug/L	<20 U	<10 U	<20 U
N-BUTYLBENZENE	ug/L	<25 U	<12.5 U	<25 U
N-PROPYLBENZENE	ug/L	<12.5 U	<6.26 U	<12.5 U
O-XYLENE	ug/L	<25 U	<12.5 U	<25 U
P-ISOPROPYLTOLUENE	ug/L	<25 U	<12.5 U	<25 U
SEC-BUTYLBENZENE	ug/L	<25 U	<12.5 U	<25 U
STYRENE	ug/L	<12.5 U	<6.26 U	<12.5 U
TERT-BUTYLBENZENE	ug/L	<25 U	<12.5 U	<25 U
TETRACHLOROETHENE	ug/L	25.9 J	31.2	31.6 J
TOLUENE	ug/L	25.4 J	<12.5 U	<25 U
TRANS-1,2-DICHLOROETHENE	ug/L	<25 U	19.9 J	15.4 J

LHAAP GWTP Influent - Monthly Sampling
April/May/June 2014

Location ID: **Sample Date:**	**Units**	**LH18/24-SP140-7164-GRAB 4/10/2014**	**LH18/24-SP140-7171-GRAB 5/5/2014**	**LH18/24-SP140-7179-GRABDL01 6/2/2014**
ID Location:		GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly	GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly	GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly
TRANS-1,3-DICHLOROPROPENE	ug/L	<50 U	<25 U	<50 U
TRICHLOROETHENE	ug/L	6360	10000	12500
TRICHLOROFLUOROMETHANE	ug/L	<25 U	<12.5 U	<25 U
VINYL CHLORIDE	ug/L	30.8 J	48.9	62.5

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP GWTP Effluent - Quarterly Sampling
March 2014

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6161-COMP 3/24/2014	LH18/24-SP650-6161-GRAB 3/24/2014
ID Location:			GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Quarterly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Quarterly
Oil and Grease (1664A)				
OIL & GREASE	mg/L		8.6	<2.8 U
Chemical Oxygen Demand (410.4)				
CHEMICAL OXYGEN DEMAND	mg/L		125	141
Metals (6010C)				
ALUMINUM	mg/L	1.644	<0.1 U	<0.1 U
IRON	mg/L	2.395	0.0804 J	0.0691 J
Metals (6020A)				
ANTIMONY	mg/L		<0.001 U	<0.001 U
ARSENIC	mg/L	0.772	0.00233	0.00263
BARIUM	mg/L	2	0.134	0.134
CADMIUM	mg/L	0.0034	<0.0006 U	<0.0006 U
CHROMIUM	mg/L	0.752	0.00306 J	0.00236 J
COBALT	mg/L	11.495	0.000912 J	0.000759 J
LEAD	mg/L	0.0046	<0.001 U	<0.001 U
MANGANESE	mg/L	15.494	0.0981	0.0987
NICKEL	mg/L	0.184	0.00336 J	0.0025 J
SELENIUM	mg/L	0.012	0.00765	0.00921
SILVER	mg/L	0.003	<0.001 U	<0.001 U
THALLIUM	mg/L		<0.0002 U	<0.0002 U
VANADIUM	mg/L	3.592	<0.001 U	<0.001 U
ZINC	mg/L	0.31	0.032 J	<0.025 U
Perchlorate (6850)				
PERCHLORATE	ug/L	13	<0.2 U	<0.2 U
Hexavalent Chromium (7196A)				
HEXAVALENT CHROMIUM	mg/L	0.124	0.0053 J	0.00505 J
Volatile Organic Compounds (8260B)				
1,1,1,2-TETRACHLOROETHANE	ug/L		N/A	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	7230	N/A	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		N/A	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	217	N/A	<0.5 U
1,1-DICHLOROETHANE	ug/L	14032	N/A	<0.25 U
1,1-DICHLOROETHENE	ug/L	253	N/A	<1 U
1,1-DICHLOROPROPENE	ug/L		N/A	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		N/A	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		N/A	<1 U
1,2,4-TRICHLOROBENZENE	ug/L		N/A	<0.4 U

LHAAP GWTP Effluent - Quarterly Sampling
March 2014

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6161-COMP 3/24/2014	LH18/24-SP650-6161-GRAB 3/24/2014
ID Location:			GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Quarterly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Quarterly
1,2,4-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L		N/A	<2 U
1,2-DIBROMOETHANE	ug/L		N/A	<0.5 U
1,2-DICHLOROBENZENE	ug/L		N/A	<0.25 U
1,2-DICHLOROETHANE	ug/L	181	N/A	<0.5 U
1,2-DICHLOROPROPANE	ug/L		N/A	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		N/A	<0.5 U
1,3-DICHLOROBENZENE	ug/L		N/A	<0.5 U
1,3-DICHLOROPROPANE	ug/L		N/A	<0.4 U
1,4-DICHLOROBENZENE	ug/L		N/A	<0.25 U
2,2-DICHLOROPROPANE	ug/L		N/A	<0.5 U
2-BUTANONE	ug/L		N/A	<5 U
2-CHLOROTOLUENE	ug/L		N/A	<0.25 U
2-HEXANONE	ug/L		N/A	<5 U
4-CHLOROTOLUENE	ug/L		N/A	<0.5 U
4-METHYL-2-PENTANONE	ug/L		N/A	<5 U
ACETONE	ug/L	2395	N/A	3.78 J
BENZENE	ug/L	181	N/A	<0.25 U
BROMOBENZENE	ug/L		N/A	<0.25 U
BROMOCHLOROMETHANE	ug/L		N/A	<0.4 U
BROMODICHLOROMETHANE	ug/L		N/A	<0.5 U
BROMOFORM	ug/L		N/A	<1 U
BROMOMETHANE	ug/L		N/A	<1 U
CARBON DISULFIDE	ug/L	181	N/A	2.84
CARBON TETRACHLORIDE	ug/L	47180	N/A	<0.5 U
CHLOROBENZENE	ug/L		N/A	<0.25 U
CHLOROETHANE	ug/L	3615	N/A	<1 U
CHLOROFORM	ug/L		N/A	<0.25 U
CHLOROMETHANE	ug/L		N/A	<1 U
CIS-1,2-DICHLOROETHENE	ug/L		N/A	1.28
CIS-1,3-DICHLOROPROPENE	ug/L		N/A	<0.5 U
DIBROMOCHLOROMETHANE	ug/L		N/A	<0.5 U
DIBROMOMETHANE	ug/L		N/A	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		N/A	<0.5 UJ
ETHYLBENZENE	ug/L	57025	N/A	<0.5 U
HEXACHLOROBUTADIENE	ug/L		N/A	<0.5 U
ISOPROPYLBENZENE	ug/L		N/A	<0.5 U
M,P-XYLENE	ug/L	83.6	N/A	<1 U
METHYLENE CHLORIDE	ug/L	1699	N/A	<0.5 U
NAPHTHALENE	ug/L		N/A	<0.4 U
N-BUTYLBENZENE	ug/L		N/A	<0.5 U
N-PROPYLBENZENE	ug/L		N/A	<0.25 U
O-XYLENE	ug/L	83.6	N/A	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		N/A	<0.5 U

LHAAP GWTP Effluent - Quarterly Sampling
March 2014

Location ID: Sample Date:	Units	Daily Maximum Conc	LH18/24-SP650-6161-COMP 3/24/2014	LH18/24-SP650-6161-GRAB 3/24/2014
ID Location:			GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Quarterly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Quarterly
SEC-BUTYLBENZENE	ug/L		N/A	<0.5 U
STYRENE	ug/L	5987	N/A	<0.25 U
TERT-BUTYLBENZENE	ug/L		N/A	<0.5 U
TETRACHLOROETHENE	ug/L	181	N/A	<0.5 U
TOLUENE	ug/L	4189	N/A	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L		N/A	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		N/A	<1 U
TRICHLOROETHENE	ug/L	181	N/A	1.49
TRICHLOROFLUOROMETHANE	ug/L		N/A	<0.5 U
VINYL CHLORIDE	ug/L	72	N/A	<0.5 U
Inorganic Anions (9056)				
CHLORIDE	mg/L		738	855
SULFATE	mg/L		155	191

Blue Highlighting Indicates concentrations above the Daily Maximum Concentration

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

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mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

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ug/L - micrograms per liter

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	109-061114 6/11/2014	109F-061114 6/11/2014	120-060614 6/6/2014	120F-060614 6/6/2014	126-061114 6/11/2014	126F-061114 6/11/2014	129-060614 6/6/2014	18CPTMW01SW-061214 6/12/2014	18CPTMW04SW-061214 6/12/2014	18CPTMW04SWF-061214 6/12/2014	18CPTMW04SWFD-061214 6/12/2014	18CPTMW04SWFDF-061214 6/12/2014	18CPTMW06-061214 6/12/2014	18CPTMW07-060314 6/3/2014
ID Location:			Site 18/24 – NE, just inside the fence line. Sampled Semi-Annually	Site 18/24 – NE, just inside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – W, insdie the fence line, outer region. Sampled Annualy	Site 18/24 – W, insdie the fence line, outer region. Filtered. Sampled Annualy	Site 18/24 – SE, on right side of road as you turn toward Site 18/24 entrance	Site 18/24 – SE, on right side of road as you turn toward Site 18/24 entrance. Filtered.	Site 18/24 – SW, just inside the fence line	Site 18/24 – NE, inside the fence line, middle region Shallow Wilcox Sampled Semi-Annualy	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – SSE, inside the fence line, middle region. Sampled Semi-Annually	Site 18/24 – NNE, inside the fence line, outter region. Sampled Semi-Annually
Metals (6010C)																
ALUMINUM	mg/L	100	N/A	3.93	N/A	3.47	N/A	<0.1 U	0.233	0.0506 J	N/A	<0.1 U	N/A	<0.1 U	0.124 J	0.0707 J
BERYLLIUM	mg/L	0.004	N/A	<0.01 U	N/A	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U	N/A	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U
CALCIUM	mg/L	N/A	N/A	6.29	N/A	17.8	N/A	295	13.5	31.8	N/A	13.6	N/A	13.2	8.34	14.8
IRON	mg/L	N/A	N/A	9	N/A	2.25	N/A	<0.1 U	0.429	49.2	N/A	2.66	N/A	2.42	2.72	1
MAGNESIUM	mg/L	N/A	N/A	4.69	N/A	19.4	N/A	231	10.6	21.3	N/A	14.3	N/A	14.3	7.13	1.72
POTASSIUM	mg/L	N/A	N/A	0.81 J	N/A	2.52	N/A	3.14	<1 U	3.51	N/A	126	N/A	125	241	174
SELENIUM	mg/L	0.05	N/A	<0.01 U	N/A	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U	N/A	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U
SODIUM	mg/L	N/A	N/A	62.9	N/A	526 J	N/A	809	155	107	N/A	137	N/A	135	215	146
Metals (6020A)																
ANTIMONY	mg/L	0.006	N/A	<0.001 U	N/A	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U	N/A	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U
ARSENIC	mg/L	0.01	N/A	0.00275	N/A	0.00386	N/A	0.0106	0.00109 J	0.0251	N/A	0.00861	N/A	0.00579	0.00813	0.00399
BARIUM	mg/L	2	N/A	0.204	N/A	0.0962	N/A	8.72	0.315	0.939	N/A	0.525	N/A	0.532	0.241	0.524
CADMIUM	mg/L	0.005	N/A	0.000335 J	N/A	0.000679 J	N/A	0.000397 J	<0.0006 U	<0.0006 U	N/A	<0.0006 U	N/A	<0.0006 U	<0.0006 U	<0.0006 U
CHROMIUM	mg/L	0.1	N/A	0.00617	N/A	0.00482	N/A	0.00182 J	0.00227 J	0.00129 J	N/A	0.00555	N/A	0.00143 J	0.0664	0.0196
COBALT	mg/L	6.1	N/A	0.00455	N/A	0.0339	N/A	0.00177 J	0.00103 J	0.00355	N/A	0.00208	N/A	0.00192 J	0.00231	0.000819 J
COPPER	mg/L	1.3	N/A	0.00599	N/A	0.00457	N/A	0.00316 J	0.00144 J	<0.002 U	N/A	<0.002 U	N/A	<0.002 U	<0.002 U	0.00112 J
LEAD	mg/L	0.015	N/A	0.00531 J	N/A	0.00126 J	N/A	<0.001 UJ	0.000522 J	<0.001 U	N/A	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U
MANGANESE	mg/L	14	N/A	0.111	N/A	0.437	N/A	0.0252	0.0249	0.6	N/A	0.257	N/A	0.239	0.158	0.047
NICKEL	mg/L	2	N/A	0.00895	N/A	0.0279	N/A	0.0212	0.00485 J	0.00617 J	N/A	0.00206 J	N/A	0.00201 J	0.00241 J	<0.004 U
SELENIUM	mg/L	0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	mg/L	0.51	N/A	<0.001 U	N/A	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U	N/A	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U
THALLIUM	mg/L	0.002	N/A	0.000112 J	N/A	0.000112 J	N/A	<0.0002 U	<0.0002 U	<0.0002 U	N/A	<0.0002 U	N/A	<0.0002 U	<0.0002 U	<0.0002 U
VANADIUM	mg/L	0.72	N/A	0.0138	N/A	0.00733	N/A	0.00195 J	0.00128 J	0.000554 J	N/A	<0.001 U	N/A	<0.001 U	0.000846 J	0.00113 J
ZINC	mg/L	31	N/A	0.0715	N/A	0.0349 J	N/A	0.0338 J	0.014 J	0.0182 J	N/A	<0.025 U	N/A	<0.025 U	<0.025 U	<0.025 U
Perchlorate (6850)																
PERCHLORATE	ug/L	72	25400	N/A	122000	N/A	7.84	N/A	30300	0.682	1.86	N/A	27.2	N/A	0.9	5.91
Mercury (7470A)																
MERCURY	mg/L	0.002	N/A	<0.0002 U	N/A	<0.0002 U	N/A	<0.0002 U	<0.0002 U	<0.0002 U	N/A	<0.0002 U	N/A	<0.0002 U	<0.0002 U	<0.0002 U
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<2 U	N/A	<40 U	N/A	<0.4 U	N/A	<4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	1.26 J	N/A	30.6 J	N/A	<0.25 UJ	N/A	<2.5 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<5 UJ	N/A	194 J	N/A	<1 UJ	N/A	<10 UJ	<1 UJ	<1 U	N/A	<1 U	N/A	<1 UJ	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<1.5 U	N/A	<30 U	N/A	<0.3 U	N/A	<3 U	<0.3 U	<0.3 U	N/A	<0.3 U	N/A	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<5 UJ	N/A	<100 U	N/A	<1 UJ	N/A	<10 UJ	<1 UJ	<1 U	N/A	<1 U	N/A	<1 UJ	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<2 U	N/A	<40 U	N/A	<0.4 U	N/A	<4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	1.1	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<10 UJ	N/A	<200 UJ	N/A	<2 UJ	N/A	<20 UJ	<2 UJ	<2 U	N/A	<2 U	N/A	<2 UJ	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<1.25 U	N/A	<25 U	N/A	<0.25 U	N/A	<2.5 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<2.5 U	N/A	70.6 J	N/A	<0.5 U	N/A	43.4	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<2 U	N/A	<40 U	N/A	<0.4 U	N/A	<4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	0.328 J	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<2 U	N/A	<40 U	N/A	<0.4 U	N/A	<4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<1.25 U	N/A	<25 U	N/A	<0.25 U	N/A	<2.5 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<25 U	N/A	<500 UJ	N/A	<5 U	N/A	<50 U	<5 U	<5 U	N/A	<5 U	N/A	<5 U	<5 U

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	109-061114 6/11/2014	109F-061114 6/11/2014	120-060614 6/6/2014	120F-060614 6/6/2014	126-061114 6/11/2014	126F-061114 6/11/2014	129-060614 6/6/2014	18CPTMW01SW-061214 6/12/2014	18CPTMW04SW-061214 6/12/2014	18CPTMW04SWF-061214 6/12/2014	18CPTMW04SWFD-061214 6/12/2014	18CPTMW04SWFDF-061214 6/12/2014	18CPTMW06-061214 6/12/2014	18CPTMW07-060314 6/3/2014
ID Location:			Site 18/24 – NE, just inside the fence line. Sampled Semi-Annually	Site 18/24 – NE, just inside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – W, insdie the fence line, outer region. Sampled Annualy	Site 18/24 – W, insdie the fence line, outer region. Filtered. Sampled Annualy	Site 18/24 – SE, on right side of road as you turn toward Site 18/24 entrance	Site 18/24 – SE, on right side of road as you turn toward Site 18/24 entrance. Filtered.	Site 18/24 – SW, just inside the fence line	Site 18/24 – NE, inside the fence line, middle region Shallow Wilcox Sampled Semi-Annualy	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – NW, inside the fence line, middle region Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – SSE, inside the fence line, middle region. Sampled Semi-Annually	Site 18/24 – NNE, inside the fence line, outter region. Sampled Semi-Annually
2-CHLOROTOLUENE	ug/L	2000	<1.25 UJ	N/A	<25 U	N/A	<0.25 UJ	N/A	<2.5 UJ	<0.25 UJ	<0.25 U	N/A	<0.25 U	N/A	<0.25 UJ	<0.25 U
2-HEXANONE	ug/L	6100	<25 UJ	N/A	<500 U	N/A	<5 UJ	N/A	<50 UJ	<5 UJ	<5 U	N/A	<5 U	N/A	<5 UJ	<5 U
4-CHLOROTOLUENE	ug/L	2000	<2.5 UJ	N/A	<50 UJ	N/A	<0.5 UJ	N/A	<5 UJ	<0.5 UJ	<0.5 U	N/A	<0.5 U	N/A	<0.5 UJ	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<25 U	N/A	<500 U	N/A	<5 U	N/A	<50 U	<5 U	<5 U	N/A	<5 U	N/A	<5 U	<5 U
ACETONE	ug/L	92000	<25 U	N/A	<500 U	N/A	<5 U	N/A	<50 U	<5 U	<5 UJ	N/A	<5 UJ	N/A	6.69 J	7.23 J
BENZENE	ug/L	5	<1.25 U	N/A	<25 U	N/A	<0.25 U	N/A	<2.5 U	6.57	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<1.25 U	N/A	<25 U	N/A	<0.25 U	N/A	<2.5 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<2 U	N/A	<40 U	N/A	<0.4 U	N/A	<4 U	7.72	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<5 U	N/A	<100 U	N/A	<1 U	N/A	<10 U	<1 U	<1 U	N/A	<1 U	N/A	<1 U	<1 U
BROMOMETHANE	ug/L	140	<5 U	N/A	<100 U	N/A	<1 U	N/A	<10 U	<1 U	<1 U	N/A	<1 U	N/A	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<5 U	N/A	<100 U	N/A	<1 U	N/A	<10 U	<1 U	<1 U	N/A	<1 U	N/A	1.23 J	<1 U
CARBON TETRACHLORIDE	ug/L	5	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<1.25 U	N/A	<25 U	N/A	<0.25 U	N/A	<2.5 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<5 U	N/A	<100 U	N/A	<1 U	N/A	<10 U	<1 U	<1 U	N/A	<1 U	N/A	<1 U	<1 U
CHLOROFORM	ug/L	1000	<1.25 U	N/A	58.8 J	N/A	<0.25 U	N/A	3.33 J	0.44 J	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<5 U	N/A	<100 U	N/A	<1 U	N/A	<10 U	<1 U	<1 U	N/A	<1 U	N/A	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	116	N/A	2340	N/A	<0.5 U	N/A	10.7	2.75	<0.5 U	N/A	<0.5 U	N/A	1.9	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	0.856 J	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
m,p-Xylene	ug/L	10000	<5 U	N/A	<100 U	N/A	<1 U	N/A	<10 U	3.37	<1 U	N/A	<1 U	N/A	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<2.5 U	N/A	363	N/A	<0.5 U	N/A	<5 U	2630	<0.5 U	N/A	<0.5 U	N/A	51.1	0.375 J
NAPHTHALENE	ug/L	2000	<2 UJ	N/A	<40 U	N/A	<0.4 UJ	N/A	<4 UJ	<0.4 UJ	<0.4 U	N/A	<0.4 U	N/A	<0.4 UJ	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<1.25 U	N/A	<25 U	N/A	<0.25 U	N/A	<2.5 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	2.42	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
STYRENE	ug/L	100	<1.25 U	N/A	<25 U	N/A	<0.25 U	N/A	<2.5 U	0.13 J	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	0.279 J	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	6.36	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	1.84 J	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	0.434 J	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<5 U	N/A	<100 U	N/A	<1 U	N/A	<10 U	<1 U	<1 U	N/A	<1 U	N/A	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	801	N/A	28100	N/A	<0.5 U	N/A	2730	183	<0.5 U	N/A	<0.5 U	N/A	8.76	1.47
TRICHLOROFLUOROMETHANE	ug/L	31000	<2.5 U	N/A	<50 U	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<2.5 U	N/A	119	N/A	<0.5 U	N/A	<5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	18CPTMW08 DW-061214 6/12/2014	18CPTMW08 SW-061214 6/12/2014	18CPTMW10 SW-061214 6/12/2014	18CPTMW10 SWF-061214 6/12/2014	18CPTMW12 SW-061214 6/12/2014	18CPTMW12 SWFD-061214 6/12/2014	18CPTMW15-061314 6/13/2014	18CPTMW15F-061314 6/13/2014	18CPTMW16-061314 6/13/2014	18CPTMW19-061314 6/13/2014	18CPTMW19F-061314 6/13/2014	18CPTMW22-061314 6/13/2014	18CPTMW23-060314 6/3/2014
ID Location:			Site 18/24 – N, inside the fence line. Deep Wilcox. Sampled Semi-Annually	Site 18/24 – N, inside the fence line, outter region. Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – WSW, outside the fence line, along the outter loop road. Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – WSW, outside the fence line, along the outter loop road. Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the road surrounding the fence line Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the road surrounding the fence line Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line, near Harrison Bayou. Sampled Semi-Annually	Site 18/24 – N, outside the fence line. Sampled Semi-Annually	Site 18/24 – N, outside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – S, outside the fence line, along the road surrounding the fence line. Sampled Semi-Annually	Site 18/24 – WNW, outside the fence line, near the road surrounding the fence line. Sampled Semi-Annually
Metals (6010C)															
ALUMINUM	mg/L	100	N/A	0.299	N/A	<0.1 U	N/A	N/A	N/A	0.0788 J	N/A	N/A	3.14	0.075 J	N/A
BERYLLIUM	mg/L	0.004	N/A	<0.01 U	N/A	<0.01 U	N/A	N/A	N/A	<0.01 U	N/A	N/A	<0.01 U	<0.01 U	N/A
CALCIUM	mg/L	N/A	N/A	37.5	N/A	39.3	N/A	N/A	N/A	37.4	N/A	N/A	2.31	43.4	N/A
IRON	mg/L	N/A	N/A	1.29	N/A	83.1	N/A	N/A	N/A	4.56	N/A	N/A	4.12	<0.1 U	N/A
MAGNESIUM	mg/L	N/A	N/A	34.2	N/A	22.1	N/A	N/A	N/A	35	N/A	N/A	1.55	35.3	N/A
POTASSIUM	mg/L	N/A	N/A	5.22	N/A	4.27	N/A	N/A	N/A	5.7	N/A	N/A	4.75	1.49 J	N/A
SELENIUM	mg/L	0.05	N/A	<0.01 U	N/A	<0.01 U	N/A	N/A	N/A	<0.01 U	N/A	N/A	<0.01 U	<0.01 U	N/A
SODIUM	mg/L	N/A	N/A	141	N/A	127	N/A	N/A	N/A	404	N/A	N/A	24.2	158	N/A
Metals (6020A)															
ANTIMONY	mg/L	0.006	N/A	<0.001 U	N/A	<0.001 U	N/A	N/A	N/A	<0.001 U	N/A	N/A	<0.001 U	<0.001 U	N/A
ARSENIC	mg/L	0.01	N/A	0.00259	N/A	0.00588	N/A	N/A	N/A	0.0083	N/A	N/A	0.00403	0.00479	N/A
BARIUM	mg/L	2	N/A	1.08	N/A	0.556	N/A	N/A	N/A	0.445	N/A	N/A	0.0798	0.49	N/A
CADMIUM	mg/L	0.005	N/A	<0.0006 U	N/A	<0.0006 U	N/A	N/A	N/A	0.000791 J	N/A	N/A	<0.0006 U	<0.0006 U	N/A
CHROMIUM	mg/L	0.1	N/A	0.00242 J	N/A	<0.002 U	N/A	N/A	N/A	<0.002 U	N/A	N/A	0.00868	<0.002 U	N/A
COBALT	mg/L	6.1	N/A	0.0213	N/A	0.00624	N/A	N/A	N/A	0.143	N/A	N/A	0.000965 J	0.0013 J	N/A
COPPER	mg/L	1.3	N/A	0.00141 J	N/A	<0.002 U	N/A	N/A	N/A	0.00124 J	N/A	N/A	0.00214 J	<0.002 U	N/A
LEAD	mg/L	0.015	N/A	<0.001 U	N/A	<0.001 U	N/A	N/A	N/A	<0.001 U	N/A	N/A	0.00137 J	<0.001 U	N/A
MANGANESE	mg/L	14	N/A	0.978	N/A	0.951	N/A	N/A	N/A	0.838	N/A	N/A	0.0224	0.0528	N/A
NICKEL	mg/L	2	N/A	0.0154	N/A	0.00748 J	N/A	N/A	N/A	0.0866	N/A	N/A	0.00427 J	0.00496 J	N/A
SELENIUM	mg/L	0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	mg/L	0.51	N/A	<0.001 U	N/A	<0.001 U	N/A	N/A	N/A	<0.001 U	N/A	N/A	<0.001 U	<0.001 U	N/A
THALLIUM	mg/L	0.002	N/A	<0.0002 U	N/A	<0.0002 U	N/A	N/A	N/A	<0.0002 U	N/A	N/A	<0.0002 U	<0.0002 U	N/A
VANADIUM	mg/L	0.72	N/A	0.000873 J	N/A	<0.001 U	N/A	N/A	N/A	<0.001 U	N/A	N/A	0.00693	<0.001 U	N/A
ZINC	mg/L	31	N/A	0.0314 J	N/A	0.0418 J	N/A	N/A	N/A	0.0826	N/A	N/A	0.0176 J	<0.025 U	N/A
Perchlorate (6850)															
PERCHLORATE	ug/L	72	54.6	47700	24.4	N/A	N/A	N/A	593	N/A	<0.2 U	5.05	N/A	106000	11000
Mercury (7470A)															
MERCURY	mg/L	0.002	N/A	<0.0002 U	N/A	<0.0002 U	N/A	N/A	N/A	<0.0002 U	N/A	N/A	<0.0002 U	<0.0002 U	N/A
Volatile Organic Compounds (8260B)															
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	<0.4 U	<2 U
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,1-DICHLOROETHANE	ug/L	10000	N/A	4.43	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	1.47 J
1,1-DICHLOROETHENE	ug/L	7	N/A	1.2 J	<1 UJ	N/A	<1 UJ	<1 UJ	<1 U	N/A	N/A	<1 UJ	N/A	2.89	11.8
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<0.3 U	<0.3 U	N/A	<0.3 U	<0.3 U	<0.3 U	N/A	N/A	<0.3 U	N/A	<0.3 U	<1.5 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	N/A	<1 U	<1 UJ	N/A	<1 UJ	<1 UJ	<1 U	N/A	N/A	<1 UJ	N/A	<1 U	<5 U
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	<0.4 U	<2 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<2 U	<2 UJ	N/A	<2 UJ	<2 UJ	<2 U	N/A	N/A	<2 UJ	N/A	<2 U	<10 U
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,2-DICHLOROBENZENE	ug/L	600	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	<1.25 U
1,2-DICHLOROETHANE	ug/L	5	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	350
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	<0.4 U	<2 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,3-DICHLOROBENZENE	ug/L	3100	N/A	0.253 J	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
1,3-DICHLOROPROPANE	ug/L	29	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	<0.4 U	<2 U
1,4-DICHLOROBENZENE	ug/L	75	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	<1.25 U
2,2-DICHLOROPROPANE	ug/L	42	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
2-BUTANONE	ug/L	61000	N/A	<5 U	<5 U	N/A	<5 U	<5 U	<5 U	N/A	N/A	<5 U	N/A	<5 U	<25 U

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	18CPTMW08 DW-061214 6/12/2014	18CPTMW08 SW-061214 6/12/2014	18CPTMW10 SW-061214 6/12/2014	18CPTMW10 SWF-061214 6/12/2014	18CPTMW12 SW-061214 6/12/2014	18CPTMW12 SWFD-061214 6/12/2014	18CPTMW15-061314 6/13/2014	18CPTMW15F-061314 6/13/2014	18CPTMW16-061314 6/13/2014	18CPTMW19-061314 6/13/2014	18CPTMW19F-061314 6/13/2014	18CPTMW22-061314 6/13/2014	18CPTMW23-060314 6/3/2014
ID Location:			Site 18/24 – N, inside the fence line. Deep Wilcox. Sampled Semi-Annually	Site 18/24 – N, inside the fence line, outter region. Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – WSW, outside the fence line, along the outter loop road. Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – WSW, outside the fence line, along the outter loop road. Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the road surrounding the fence line Shallow Wilcox. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the road surrounding the fence line Shallow Wilcox. Filtered. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line, near Harrison Bayou. Sampled Semi-Annually	Site 18/24 – N, outside the fence line. Sampled Semi-Annually	Site 18/24 – N, outside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – S, outside the fence line, along the road surrounding the fence line. Sampled Semi-Annually	Site 18/24 – WNW, outside the fence line, near the road surrounding the fence line. Sampled Semi-Annually
2-CHLOROTOLUENE	ug/L	2000	N/A	<0.25 U	<0.25 UJ	N/A	<0.25 UJ	<0.25 UJ	<0.25 U	N/A	N/A	<0.25 UJ	N/A	<0.25 U	<1.25 U
2-HEXANONE	ug/L	6100	N/A	<5 U	<5 UJ	N/A	<5 UJ	<5 UJ	<5 U	N/A	N/A	<5 UJ	N/A	<5 U	<25 U
4-CHLOROTOLUENE	ug/L	2000	N/A	<0.5 U	<0.5 UJ	N/A	<0.5 UJ	<0.5 UJ	<0.5 U	N/A	N/A	<0.5 UJ	N/A	<0.5 U	<2.5 U
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<5 U	<5 U	N/A	<5 U	<5 U	<5 U	N/A	N/A	<5 U	N/A	<5 U	<25 U
ACETONE	ug/L	92000	N/A	<5 UJ	<5 U	N/A	<5 U	<5 U	<5 UJ	N/A	N/A	<5 U	N/A	<5 UJ	<25 U
BENZENE	ug/L	5	N/A	0.158 J	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	2.35 J
BROMOBENZENE	ug/L	2000	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	<1.25 U
BROMOCHLOROMETHANE	ug/L	4100	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	N/A	<0.4 U	<2 U
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
BROMOFORM	ug/L	36	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	<1 U	<5 U
BROMOMETHANE	ug/L	140	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	<1 U	<5 U
CARBON DISULFIDE	ug/L	10000	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	<1 U	<5 U
CARBON TETRACHLORIDE	ug/L	5	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
CHLOROBENZENE	ug/L	100	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	<1.25 U
CHLOROETHANE	ug/L	41000	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	<1 U	<5 U
CHLOROFORM	ug/L	1000	N/A	0.758 J	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	1.68	7.08
CHLOROMETHANE	ug/L	220	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	<1 U	<5 U
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	19.9	<0.5 U	N/A	0.798 J	0.8 J	0.771 J	N/A	N/A	<0.5 U	N/A	0.414 J	189
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
DIBROMOMETHANE	ug/L	380	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
ETHYLBENZENE	ug/L	700	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
HEXACHLOROBUTADIENE	ug/L	20	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
ISOPROPYLBENZENE	ug/L	1000	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
m,p-Xylene	ug/L	10000	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	<1 U	<5 U
METHYLENE CHLORIDE	ug/L	5	N/A	0.262 J	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
NAPHTHALENE	ug/L	2000	N/A	<0.4 U	<0.4 UJ	N/A	<0.4 UJ	<0.4 UJ	<0.4 U	N/A	N/A	<0.4 UJ	N/A	<0.4 U	<2 U
N-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
N-PROPYLBENZENE	ug/L	4100	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	<1.25 U
O-XYLENE	ug/L	10000	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
SEC-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
STYRENE	ug/L	100	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	N/A	<0.25 U	<1.25 U
TERT-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
TETRACHLOROETHENE	ug/L	5	N/A	0.295 J	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	1.5 J
TOLUENE	ug/L	1000	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	0.426 J	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	3.51	5.19
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A	<1 U	N/A	<1 U	<5 U
TRICHLOROETHENE	ug/L	5	N/A	88.3	0.719 J	N/A	1.28	1.26	4.02	N/A	N/A	<0.5 U	N/A	58.9	5670
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	N/A	<0.5 U	<2.5 U
VINYL CHLORIDE	ug/L	2	N/A	15.5	<0.5 U	N/A	<0.5 U	<0.5 U	0.715 J	N/A	N/A	<0.5 U	N/A	<0.5 U	4.77 J

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	18CPTMW23F-060314 6/3/2014	18WW03-060514 6/5/2014	18WW06-060414 6/4/2014	18WW06FD-060414 6/4/2014	18WW08-060314 6/3/2014	18WW08F-060314 6/3/2014	18WW09-060314 6/3/2014	18WW18-061314 6/13/2014	18WW19-060514 6/5/2014	18WW19FD-060514 6/5/2014	AWD1-060514 6/5/2014	AWD1F-060514 6/5/2014	AWD2-060414 6/4/2014	AWD3-061014 6/10/2014
ID Location:			Site 18/24 – WNW, outside the fence line, near the road surrounding the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – E, outside the fence line. Sampled Annually	Site 18/24 – W, just outside the fence line. Sampled Annually	Site 18/24 – W, just outside the fence line. Sampled Annually	Site 18/24 – NNW, outside the fence line. Sampled Semi-Annually	Site 18/24 – NNW, outside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line, near Harrison Bayou. Sampled Annually	Site 18/24 – NE, outside the fence line, by the outer loop road. Sampled Semi-Annually	Site 18/24 – NNW, outside the fence line.	Site 18/24 – NNW, outside the fence line.	Site 18/24 – W, just inside the fence line. Sampled Semi-Annually	Site 18/24 – W, just inside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – WNW, inside the fence line.	Site 18/24 – SW, inside the fence line. Sampled Annually
Metals (6010C)																
ALUMINUM	mg/L	100	<0.1 U	N/A	0.592	0.324	N/A	<0.1 U	0.0945 J	N/A	N/A	N/A	N/A	1.31	0.717	0.16 J
BERYLLIUM	mg/L	0.004	<0.01 U	N/A	<0.01 U	<0.01 U	N/A	<0.01 U	<0.01 U	N/A	N/A	N/A	N/A	<0.01 U	<0.01 U	<0.01 U
CALCIUM	mg/L	N/A	17.7	N/A	32.1	31.6	N/A	19.6	15.2	N/A	N/A	N/A	N/A	5.04	40.3	0.863
IRON	mg/L	N/A	11.6	N/A	77.5	76.7	N/A	2.65	38	N/A	N/A	N/A	N/A	4.19	1.03	1.1
MAGNESIUM	mg/L	N/A	14.7	N/A	17.6	17.4	N/A	27.2	9.01	N/A	N/A	N/A	N/A	6.08	56	0.605 J
POTASSIUM	mg/L	N/A	5.18	N/A	3.25	3.16	N/A	1.24 J	1.85 J	N/A	N/A	N/A	N/A	4.45	1.12 J	0.552 J
SELENIUM	mg/L	0.05	<0.01 U	N/A	<0.01 U	<0.01 U	N/A	<0.01 U	<0.01 U	N/A	N/A	N/A	N/A	0.00656 J	<0.01 U	<0.01 U
SODIUM	mg/L	N/A	143	N/A	108	107	N/A	362	49.5	N/A	N/A	N/A	N/A	123	53.8	28.8
Metals (6020A)																
ANTIMONY	mg/L	0.006	<0.001 U	N/A	<0.001 U	<0.001 U	N/A	<0.001 U	<0.001 U	N/A	N/A	N/A	N/A	0.00293	<0.001 U	<0.001 U
ARSENIC	mg/L	0.01	0.00124 J	N/A	0.00476	0.00492	N/A	0.00399	0.00165 J	N/A	N/A	N/A	N/A	0.0152	0.00072 J	<0.001 U
BARIUM	mg/L	2	0.239	N/A	0.506	0.477	N/A	0.0225	0.299 J	N/A	N/A	N/A	N/A	0.56	0.798	0.0423
CADMIUM	mg/L	0.005	<0.0006 U	N/A	<0.0006 U	<0.0006 U	N/A	<0.0006 U	<0.0006 U	N/A	N/A	N/A	N/A	<0.0006 U	<0.0006 U	<0.0006 U
CHROMIUM	mg/L	0.1	<0.002 U	N/A	0.0504	0.0523	N/A	<0.002 U	0.129	N/A	N/A	N/A	N/A	0.00572	0.103	0.249
COBALT	mg/L	6.1	0.0358	N/A	0.00119 J	0.00129 J	N/A	0.0305	0.00122 J	N/A	N/A	N/A	N/A	0.0162	0.00209	0.00075 J
COPPER	mg/L	1.3	0.00117 J	N/A	0.00427	0.00453	N/A	0.00356 J	0.00321 J	N/A	N/A	N/A	N/A	0.00276 J	0.00248 J	0.00305 J
LEAD	mg/L	0.015	<0.001 U	N/A	<0.001 U	<0.001 U	N/A	<0.001 U	<0.001 U	N/A	N/A	N/A	N/A	0.00104 J	<0.001 U	<0.001 UJ
MANGANESE	mg/L	14	0.781	N/A	0.835	0.718	N/A	1.66	0.884	N/A	N/A	N/A	N/A	0.575	0.0349	0.0066
NICKEL	mg/L	2	0.0308	N/A	0.0787	0.0853	N/A	0.0241	0.0492	N/A	N/A	N/A	N/A	0.0302	0.13	0.0259
SELENIUM	mg/L	0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	mg/L	0.51	<0.001 U	N/A	<0.001 U	<0.001 U	N/A	<0.001 U	<0.001 U	N/A	N/A	N/A	N/A	<0.001 U	<0.001 U	<0.001 U
THALLIUM	mg/L	0.002	<0.0002 U	N/A	<0.0002 U	<0.0002 U	N/A	<0.0002 U	<0.0002 U	N/A	N/A	N/A	N/A	<0.0002 U	<0.0002 U	<0.0002 U
VANADIUM	mg/L	0.72	<0.001 U	N/A	0.00183 J	0.00188 J	N/A	<0.001 U	0.0013 J	N/A	N/A	N/A	N/A	0.003	0.00305	0.000773 J
ZINC	mg/L	31	0.0383 J	N/A	<0.025 U	<0.025 U	N/A	0.0214 J	<0.025 U	N/A	N/A	N/A	N/A	0.0449 J	<0.025 U	<0.025 U
Perchlorate (6850)																
PERCHLORATE	ug/L	72	N/A	N/A	<0.2 U	<0.2 U	3.36	N/A	<0.2 U	0.14 J	<0.2 U	<0.2 U	0.287 J	N/A	498	25
Mercury (7470A)																
MERCURY	mg/L	0.002	<0.0002 U	N/A	<0.0002 U	<0.0002 U	N/A	<0.0002 U	<0.0002 U	N/A	N/A	N/A	N/A	<0.0002 U	<0.0002 U	<0.0002 U
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	N/A	N/A	<80 U	N/A	<0.4 U	<2 U
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,1-DICHLOROETHANE	ug/L	10000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	528	N/A	0.138 J	<1.25 U
1,1-DICHLOROETHENE	ug/L	7	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	769	N/A	<1 U	<5 U
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<0.3 U	<0.3 U	<0.3 U	<0.3 U	N/A	<0.3 U	N/A	N/A	N/A	<60 U	N/A	<0.3 U	<1.5 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	N/A	N/A	<80 U	N/A	<0.4 U	<2 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<2 UJ	<2 U	<2 U	<2 U	N/A	<2 U	N/A	N/A	N/A	<400 UJ	N/A	<2 U	<10 UJ
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,2-DICHLOROBENZENE	ug/L	600	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
1,2-DICHLOROETHANE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	792	N/A	5.44	<2.5 U
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	N/A	N/A	<80 U	N/A	<0.4 U	<2 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,3-DICHLOROBENZENE	ug/L	3100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
1,3-DICHLOROPROPANE	ug/L	29	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	N/A	N/A	<80 U	N/A	<0.4 U	<2 U
1,4-DICHLOROBENZENE	ug/L	75	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
2,2-DICHLOROPROPANE	ug/L	42	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
2-BUTANONE	ug/L	61000	N/A	<5 UJ	<5 U	<5 U	<5 U	N/A	<5 U	N/A	N/A	N/A	<1000 UJ	N/A	<5 U	<25 UJ

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	18CPTMW23F-060314 6/3/2014	18WW03-060514 6/5/2014	18WW06-060414 6/4/2014	18WW06FD-060414 6/4/2014	18WW08-060314 6/3/2014	18WW08F-060314 6/3/2014	18WW09-060314 6/3/2014	18WW18-061314 6/13/2014	18WW19-060514 6/5/2014	18WW19FD-060514 6/5/2014	AWD1-060514 6/5/2014	AWD1F-060514 6/5/2014	AWD2-060414 6/4/2014	AWD3-061014 6/10/2014
ID Location:			Site 18/24 – WNW, outside the fence line, near the road surrounding the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – E, outside the fence line. Sampled Annually	Site 18/24 – W, just outside the fence line. Sampled Annually	Site 18/24 – W, just outside the fence line. Sampled Annually	Site 18/24 – NNW, outside the fence line. Sampled Semi-Annually	Site 18/24 – NNW, outside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – NW, outside the fence line, near Harrison Bayou. Sampled Annually	Site 18/24 – NE, outside the fence line, by the outer loop road. Sampled Semi-Annually	Site 18/24 – NNW, outside the fence line.	Site 18/24 – NNW, outside the fence line.	Site 18/24 – W, just inside the fence line. Sampled Semi-Annually	Site 18/24 – W, just inside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – WNW, inside the fence line.	Site 18/24 – SW, inside the fence line. Sampled Annually
2-CHLOROTOLUENE	ug/L	2000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
2-HEXANONE	ug/L	6100	N/A	<5 U	<5 U	<5 U	<5 U	N/A	<5 U	N/A	N/A	N/A	<1000 U	N/A	<5 U	<25 U
4-CHLOROTOLUENE	ug/L	2000	N/A	<0.5 UJ	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 UJ	N/A	<0.5 U	<2.5 UJ
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<5 U	<5 U	<5 U	<5 U	N/A	<5 U	N/A	N/A	N/A	<1000 U	N/A	<5 U	<25 U
ACETONE	ug/L	92000	N/A	<5 U	<5 U	<5 U	<5 U	N/A	<5 U	N/A	N/A	N/A	<1000 U	N/A	<5 U	<25 U
BENZENE	ug/L	5	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
BROMOBENZENE	ug/L	2000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
BROMOCHLOROMETHANE	ug/L	4100	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	N/A	N/A	<80 U	N/A	<0.4 U	<2 U
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
BROMOFORM	ug/L	36	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
BROMOMETHANE	ug/L	140	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
CARBON DISULFIDE	ug/L	10000	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
CARBON TETRACHLORIDE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	24.6
CHLOROBENZENE	ug/L	100	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
CHLOROETHANE	ug/L	41000	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
CHLOROFORM	ug/L	1000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
CHLOROMETHANE	ug/L	220	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	59600	N/A	63.7	2.89 J
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
DIBROMOMETHANE	ug/L	380	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
ETHYLBENZENE	ug/L	700	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
HEXACHLOROBUTADIENE	ug/L	20	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
ISOPROPYLBENZENE	ug/L	1000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
m,p-Xylene	ug/L	10000	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
METHYLENE CHLORIDE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	160 J	N/A	<0.5 U	<2.5 U
NAPHTHALENE	ug/L	2000	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	N/A	N/A	N/A	<80 U	N/A	<0.4 U	<2 U
N-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
N-PROPYLBENZENE	ug/L	4100	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
O-XYLENE	ug/L	10000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
SEC-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
STYRENE	ug/L	100	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	N/A	N/A	N/A	<50 U	N/A	<0.25 U	<1.25 U
TERT-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
TETRACHLOROETHENE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	1.96 J
TOLUENE	ug/L	1000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	0.288 J	<2.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<1 U	<1 U	<1 U	<1 U	N/A	<1 U	N/A	N/A	N/A	<200 U	N/A	<1 U	<5 U
TRICHLOROETHENE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	20800	N/A	166	499
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	<100 U	N/A	<0.5 U	<2.5 U
VINYL CHLORIDE	ug/L	2	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	N/A	N/A	N/A	1170	N/A	0.331 J	<2.5 U

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	AWD3FD-061014 6/10/2014	AWD4-060314 6/3/2014	AWD4F-060314 6/3/2014	C01-061114 6/11/2014	C04-060414 6/4/2014	C08-060414 6/4/2014	MW10-060314 6/3/2014	MW1-061014 6/10/2014	MW10F-060314 6/3/2014	MW14-060514 6/5/2014	MW16-060514 6/5/2014	MW16F-060514 6/5/2014	MW17-060414 6/4/2014	MW18-061314 6/13/2014
ID Location:			Site 18/24 – SW, inside the fence line. Sampled Annually	Site 18/24 – NNW, outside the fence line, along the perimeter road.	Site 18/24 – NNW, outside the fence line, along the perimeter road. Filtered.	LHAAP-18/24 - S, outside containment along S side of road leading to GWTP.	Site 18/24 – N, outside the fence line, along the road heading north. Sampled Annually	Site 18/24 – E, outside the fence line, along the road heading east-northeast. Sampled Semi-Annually	Site 18/24 – W, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – N, inside the fencline. Sampled Annually	Site 18/24 – W, outside the fence line, along the outer loop road. Filtered. Sampled Semi-Annually	LHAAP-18/24 - inside containment. Sampled Annually	Site 18/24 – W, outside the fence line, along the road surrounding the fence line. Sampled Semi-Annually	Site 18/24 – W, outside the fence line, along the road surrounding the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – W, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the outer loop road. Sampled Semi-Annually
Metals (6010C)																
ALUMINUM	mg/L	100	0.272	N/A	<0.1 U	N/A	N/A	0.315	N/A	0.111 J	<0.1 U	<0.1 U	N/A	<0.1 U	<0.1 U	N/A
BERYLLIUM	mg/L	0.004	<0.01 U	N/A	<0.01 U	N/A	N/A	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U	N/A	<0.01 U	<0.01 U	N/A
CALCIUM	mg/L	N/A	0.871	N/A	24.4	N/A	N/A	203	N/A	71.8	19.8	86.2	N/A	34.4	60.4	N/A
IRON	mg/L	N/A	1.03	N/A	14.3	N/A	N/A	0.601	N/A	35.4	7.48	152	N/A	68	1.96	N/A
MAGNESIUM	mg/L	N/A	0.607 J	N/A	21.8	N/A	N/A	130	N/A	63.2	11.2	54.9	N/A	20.9	25.7	N/A
POTASSIUM	mg/L	N/A	0.608 J	N/A	1.7 J	N/A	N/A	1.65 J	N/A	3.54	3.66	10.9	N/A	3.73	2.83	N/A
SELENIUM	mg/L	0.05	<0.01 U	N/A	<0.01 U	N/A	N/A	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U	N/A	<0.01 U	<0.01 U	N/A
SODIUM	mg/L	N/A	28.7	N/A	140	N/A	N/A	741	N/A	363	97.8	454	N/A	154	90.3	N/A
Metals (6020A)																
ANTIMONY	mg/L	0.006	<0.001 U	N/A	<0.001 U	N/A	N/A	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U	N/A	<0.001 U	<0.001 U	N/A
ARSENIC	mg/L	0.01	<0.001 U	N/A	0.00156 J	N/A	N/A	0.00951	N/A	0.00269	0.00158 J	0.0139	N/A	0.00297	0.00311	N/A
BARIUM	mg/L	2	0.0432	N/A	0.87	N/A	N/A	4.67	N/A	2.38	0.929	0.982	N/A	0.697	0.817	N/A
CADMIUM	mg/L	0.005	<0.0006 U	N/A	0.00061 J	N/A	N/A	<0.0006 U	N/A	0.000504 J	<0.0006 U	0.000626 J	N/A	<0.0006 U	<0.0006 U	N/A
CHROMIUM	mg/L	0.1	0.256	N/A	2.09	N/A	N/A	0.00129 J	N/A	2.15	0.0572	0.0245	N/A	<0.002 U	0.00826	N/A
COBALT	mg/L	6.1	0.00074 J	N/A	0.0812	N/A	N/A	0.00784	N/A	0.099	0.0121	0.0112	N/A	0.0059	0.00907	N/A
COPPER	mg/L	1.3	0.003 J	N/A	0.0694	N/A	N/A	0.00216 J	N/A	0.00458	0.00685	0.00289 J	N/A	0.00127 J	<0.002 U	N/A
LEAD	mg/L	0.015	<0.001 UJ	N/A	<0.001 U	N/A	N/A	<0.001 U	N/A	<0.001 UJ	<0.001 U	<0.001 U	N/A	<0.001 U	<0.001 U	N/A
MANGANESE	mg/L	14	0.00769	N/A	1.23	N/A	N/A	0.777	N/A	3.05	1.31	3.97	N/A	1.08	0.804	N/A
NICKEL	mg/L	2	0.0259	N/A	4.3	N/A	N/A	0.0103	N/A	3.66	0.73	0.0496	N/A	0.0146	0.068	N/A
SELENIUM	mg/L	0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	mg/L	0.51	<0.001 U	N/A	<0.001 U	N/A	N/A	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U	N/A	<0.001 U	<0.001 U	N/A
THALLIUM	mg/L	0.002	<0.0002 U	N/A	<0.0002 U	N/A	N/A	<0.0002 U	N/A	<0.0002 U	<0.0002 U	<0.0002 U	N/A	<0.0002 U	<0.0002 U	N/A
VANADIUM	mg/L	0.72	0.00111 J	N/A	0.0922	N/A	N/A	0.00135 J	N/A	0.0839	0.000535 J	<0.001 U	N/A	<0.001 U	<0.001 U	N/A
ZINC	mg/L	31	<0.025 U	N/A	0.0214 J	N/A	N/A	<0.025 U	N/A	0.0127 J	0.0138 J	0.158	N/A	0.0271 J	<0.025 U	N/A
Perchlorate (6850)																
PERCHLORATE	ug/L	72	26	33800	N/A	2.11	0.242 J	0.501	156	46000	N/A	247000	11600	N/A	<0.2 U	0.154 J
Mercury (7470A)																
MERCURY	mg/L	0.002	<0.0002 U	N/A	<0.0002 U	N/A	N/A	<0.0002 U	N/A	<0.0002 U	<0.0002 U	<0.0002 U	N/A	<0.0002 U	<0.0002 U	N/A
Volatile Organic Compounds (8260B)																
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<2 U	<0.4 U	N/A	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	4.26	<0.5 U	N/A	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<1.25 U	3.27	N/A	N/A	N/A	<0.25 U	<0.25 U	1.17	N/A	33.5	1.39	N/A	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<5 U	1.16 J	N/A	N/A	N/A	<1 U	<1 U	19.3	N/A	125	8.32	N/A	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<1.5 U	<0.3 U	N/A	N/A	N/A	<0.3 U	<0.3 U	<0.3 U	N/A	<0.3 U	<0.3 U	N/A	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	<1 UJ	<1 UJ	N/A	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<2 U	<0.4 U	N/A	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<10 UJ	<2 U	N/A	N/A	N/A	<2 U	<2 U	<2 UJ	N/A	<2 UJ	<2 UJ	N/A	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	13.4	N/A	84.3	49	N/A	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<2 U	<0.4 U	N/A	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<2.5 U	0.306 J	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<2 U	<0.4 U	N/A	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<25 UJ	<5 U	N/A	N/A	N/A	<5 U	<5 U	<5 UJ	N/A	<5 U	<5 U	N/A	<5 U	<5 U

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	AWD3FD-061014 6/10/2014	AWD4-060314 6/3/2014	AWD4F-060314 6/3/2014	C01-061114 6/11/2014	C04-060414 6/4/2014	C08-060414 6/4/2014	MW10-060314 6/3/2014	MW1-061014 6/10/2014	MW10F-060314 6/3/2014	MW14-060514 6/5/2014	MW16-060514 6/5/2014	MW16F-060514 6/5/2014	MW17-060414 6/4/2014	MW18-061314 6/13/2014
ID Location:			Site 18/24 – SW, inside the fence line. Sampled Annually	Site 18/24 – NNW, outside the fence line, along the perimeter road.	Site 18/24 – NNW, outside the fence line, along the perimeter road. Filtered.	LHAAP-18/24 - S, outside containment along S side of road leading to GWTP.	Site 18/24 – N, outside the fence line, along the road heading north. Sampled Annually	Site 18/24 – E, outside the fence line, along the road heading east-northeast. Sampled Semi-Annually	Site 18/24 – W, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – N, inside the fencline. Sampled Annually	Site 18/24 – W, outside the fence line, along the outer loop road. Filtered. Sampled Semi-Annually	LHAAP-18/24 - inside containment. Sampled Annually	Site 18/24 – W, outside the fence line, along the road surrounding the fence line. Sampled Semi-Annually	Site 18/24 – W, outside the fence line, along the road surrounding the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – W, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – SW, outside the fence line, along the outer loop road. Sampled Semi-Annually
2-CHLOROTOLUENE	ug/L	2000	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 UJ	<0.25 UJ	N/A	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<25 U	<5 U	N/A	N/A	N/A	<5 U	<5 U	<5 U	N/A	<5 UJ	<5 UJ	N/A	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<2.5 UJ	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 UJ	N/A	<0.5 UJ	<0.5 UJ	N/A	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<25 U	<5 U	N/A	N/A	N/A	<5 U	<5 U	<5 U	N/A	<5 U	<5 U	N/A	<5 U	<5 U
ACETONE	ug/L	92000	<25 U	<5 U	N/A	N/A	N/A	<5 U	<5 U	<5 U	N/A	<5 U	<5 U	N/A	<5 U	<5 UJ
BENZENE	ug/L	5	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	0.593 J	N/A	4.89	0.18 J	N/A	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<2 U	<0.4 U	N/A	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	N/A	<1 U	<1 U
BROMOMETHANE	ug/L	140	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	N/A	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	N/A	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	25.4	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	1.36 J	<1 U	N/A	<1 U	<1 U
CHLOROFORM	ug/L	1000	<1.25 U	0.315 J	N/A	N/A	N/A	<0.25 U	<0.25 U	1.43	N/A	11	0.261 J	N/A	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	N/A	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	2.98 J	13.4	N/A	N/A	N/A	<0.5 U	<0.5 U	11.2	N/A	1540	22.4	N/A	<0.5 U	0.386 J
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
m,p-Xylene	ug/L	10000	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	0.57 J	<1 U	N/A	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	0.61 J	N/A	5.65	<0.5 U	N/A	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<2 U	<0.4 U	N/A	N/A	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 UJ	<0.4 UJ	N/A	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	0.327 J	<0.5 U	N/A	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
STYRENE	ug/L	100	<1.25 U	<0.25 U	N/A	N/A	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	1.95 J	0.371 J	N/A	N/A	N/A	<0.5 U	<0.5 U	0.827 J	N/A	1.39	0.385 J	N/A	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	0.287 J	<0.5 U	N/A	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<2.5 U	0.309 J	N/A	N/A	N/A	<0.5 U	<0.5 U	0.906 J	N/A	19.2	0.54 J	N/A	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<5 U	<1 U	N/A	N/A	N/A	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	N/A	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	519	70.1	N/A	N/A	N/A	10.4	1.01	788	N/A	12100	559	N/A	1.69	7.23
TRICHLOROFLUOROMETHANE	ug/L	31000	<2.5 U	<0.5 U	N/A	N/A	N/A	<0.5 U	<0.5 U	0.381 J	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<2.5 U	4.58	N/A	N/A	N/A	<0.5 U	<0.5 U	7.92	N/A	5.52	<0.5 U	N/A	<0.5 U	<0.5 U

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	MW18F-061314 6/13/2014	MW19-061314 6/13/2014	MW19F-061314 6/13/2014	MW2-061014 6/10/2014	MW21-061014 6/10/2014	MW22-061014 6/10/2014	MW23-061114 6/11/2014	MW3-061014 6/10/2014	MW3F-061014 6/10/2014	MW6-061114 6/11/2014
ID Location:			Site 18/24 – SW, outside the fence line, along the outer loop road. Filtered. Sampled Semi-Annually	Site 18/24 – SSW, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – SSW, outside the fence line, along the outer loop road. Filtered. Sampled Semi-Annually	Site 18/24 – NE, inside the fence line. Sampled Semi-Annually	Site 18/24 – ENE, inside the fence line. Sampled Semi-Annually	Site 18/24 – ESE, inside the fence line. Sampled Semi-Annually	Site 18/24 – S, inside the fence line. Sampled Semi-Annually	Site 18/24 – N, inside the fence line. Sampled Semi-Annually	Site 18/24 – N, inside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – N, inside the fence line. Sampled Annually
Metals (6010C)												
ALUMINUM	mg/L	100	<0.1 U	N/A	<0.1 U	0.0524 J	<0.1 U	0.0516 J	N/A	N/A	<0.1 U	<0.1 U
BERYLLIUM	mg/L	0.004	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U	<0.01 U	N/A	N/A	<0.01 U	<0.01 U
CALCIUM	mg/L	N/A	28.7	N/A	97.2	173	320	44.5	N/A	N/A	21.2	36.9
IRON	mg/L	N/A	0.895	N/A	29	14.1	5.35	2.68	N/A	N/A	<0.1 U	0.553
MAGNESIUM	mg/L	N/A	12.2	N/A	55.5	119	262	14.4	N/A	N/A	11.9	32.1
POTASSIUM	mg/L	N/A	1.47 J	N/A	3.47	4.61	3.17	2.17	N/A	N/A	1.41 J	2.7
SELENIUM	mg/L	0.05	<0.01 U	N/A	<0.01 U	<0.01 U	<0.01 U	0.00604 J	N/A	N/A	<0.01 U	<0.01 U
SODIUM	mg/L	N/A	304	N/A	1050	322	698	405	N/A	N/A	183	257
Metals (6020A)												
ANTIMONY	mg/L	0.006	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U	0.000594 J	N/A	N/A	<0.001 U	<0.001 U
ARSENIC	mg/L	0.01	0.00755	N/A	0.019	0.0101	0.00982	0.00294	N/A	N/A	0.000971 J	0.00354
BARIUM	mg/L	2	0.298	N/A	0.0961	5.74	12.4	0.646	N/A	N/A	0.295	0.892
CADMIUM	mg/L	0.005	0.00104 J	N/A	<0.0006 U	0.00135	0.000849 J	<0.0006 U	N/A	N/A	<0.0006 U	<0.0006 U
CHROMIUM	mg/L	0.1	0.00643	N/A	0.00164 J	0.384	0.589	0.433	N/A	N/A	0.00475	0.052
COBALT	mg/L	6.1	0.00175 J	N/A	0.015	0.101	0.0961	0.00353	N/A	N/A	<0.001 U	0.000988 J
COPPER	mg/L	1.3	<0.002 U	N/A	0.00147 J	0.00358 J	0.0171	0.00756	N/A	N/A	0.00323 J	0.00221 J
LEAD	mg/L	0.015	<0.001 U	N/A	<0.001 U	<0.001 UJ	<0.001 UJ	<0.001 UJ	N/A	N/A	<0.001 UJ	<0.001 UJ
MANGANESE	mg/L	14	0.482	N/A	2.11	3.55	2.7	0.0372	N/A	N/A	0.139	0.0437
NICKEL	mg/L	2	0.183	N/A	0.88	0.406	0.824	0.17	N/A	N/A	0.00393 J	0.101
SELENIUM	mg/L	0.05	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SILVER	mg/L	0.51	<0.001 U	N/A	<0.001 U	<0.001 U	<0.001 U	<0.001 U	N/A	N/A	<0.001 U	<0.001 U
THALLIUM	mg/L	0.002	<0.0002 U	N/A	<0.0002 U	<0.0002 U	0.0001 J	<0.0002 U	N/A	N/A	<0.0002 U	<0.0002 U
VANADIUM	mg/L	0.72	<0.001 U	N/A	0.000555 J	0.00108 J	<0.002 U	0.00258	N/A	N/A	<0.001 U	0.00138 J
ZINC	mg/L	31	<0.025 U	N/A	<0.025 U	0.0511	0.0424 J	<0.025 U	N/A	N/A	<0.025 U	<0.025 U
Perchlorate (6850)												
PERCHLORATE	ug/L	72	N/A	0.548	N/A	2900	45000	824	61400 J	13400	N/A	7750
Mercury (7470A)												
MERCURY	mg/L	0.002	<0.0002 U	N/A	<0.0002 U	<0.0002 U	<0.0002 U	<0.0002 U	N/A	N/A	<0.0002 U	<0.0002 U
Volatile Organic Compounds (8260B)												
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<0.4 U	N/A	<800 U	<40 U	<0.8 U	N/A	<0.4 U	N/A	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	3.24	N/A	3.08
1,1-DICHLOROETHENE	ug/L	7	N/A	<1 UJ	N/A	<2000 UJ	<100 U	<2 U	N/A	2.89	N/A	0.912 J
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<0.3 U	N/A	<600 U	<30 U	<0.6 U	N/A	<0.3 U	N/A	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	N/A	<1 UJ	N/A	<2000 UJ	<100 U	<2 U	N/A	<1 U	N/A	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<0.4 U	N/A	<800 U	<40 U	<0.8 U	N/A	<0.4 U	N/A	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<2 U	N/A	<4000 UJ	<200 UJ	<4 UJ	N/A	<2 UJ	N/A	<2 UJ
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	N/A	0.548 J	N/A	<1000 U	85.3 J	3.19	N/A	<0.5 U	N/A	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	N/A	<800 U	<40 U	<0.8 U	N/A	<0.4 U	N/A	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	0.846 J
1,3-DICHLOROPROPANE	ug/L	29	N/A	<0.4 U	N/A	<800 U	<40 U	<0.8 U	N/A	<0.4 U	N/A	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
2-BUTANONE	ug/L	61000	N/A	<5 U	N/A	<10000 U	<500 UJ	<10 UJ	N/A	<5 UJ	N/A	<5 UJ

LHAAP-18/24 - Semi-Annual Sampling
June 2014

Location ID: Sample Date:	Units	MCL/MSC	MW18F-061314 6/13/2014	MW19-061314 6/13/2014	MW19F-061314 6/13/2014	MW2-061014 6/10/2014	MW21-061014 6/10/2014	MW22-061014 6/10/2014	MW23-061114 6/11/2014	MW3-061014 6/10/2014	MW3F-061014 6/10/2014	MW6-061114 6/11/2014
ID Location:			Site 18/24 – SW, outside the fence line, along the outer loop road. Filtered. Sampled Semi-Annually	Site 18/24 – SSW, outside the fence line, along the outer loop road. Sampled Semi-Annually	Site 18/24 – SSW, outside the fence line, along the outer loop road. Filtered. Sampled Semi-Annually	Site 18/24 – NE, inside the fence line. Sampled Semi-Annually	Site 18/24 – ENE, inside the fence line. Sampled Semi-Annually	Site 18/24 – ESE, inside the fence line. Sampled Semi-Annually	Site 18/24 – S, inside the fence line. Sampled Semi-Annually	Site 18/24 – N, inside the fence line. Sampled Semi-Annually	Site 18/24 – N, inside the fence line. Filtered. Sampled Semi-Annually	Site 18/24 – N, inside the fence line. Sampled Annually
2-CHLOROTOLUENE	ug/L	2000	N/A	<0.25 UJ	N/A	<500 UJ	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
2-HEXANONE	ug/L	6100	N/A	<5 U	N/A	<10000 UJ	<500 UJ	<10 UJ	N/A	<5 UJ	N/A	<5 U
4-CHLOROTOLUENE	ug/L	2000	N/A	<0.5 UJ	N/A	<1000 UJ	<50 UJ	<1 UJ	N/A	<0.5 UJ	N/A	<0.5 UJ
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<5 U	N/A	<10000 U	<500 U	<10 U	N/A	<5 U	N/A	<5 U
ACETONE	ug/L	92000	N/A	<5 UJ	N/A	<10000 U	<500 U	<10 U	N/A	<5 U	N/A	<5 U
BENZENE	ug/L	5	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
BROMOBENZENE	ug/L	2000	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	N/A	<0.4 U	N/A	<800 U	<40 U	<0.8 U	N/A	<0.4 U	N/A	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
BROMOFORM	ug/L	36	N/A	<1 U	N/A	<2000 U	<100 U	<2 U	N/A	<1 U	N/A	<1 U
BROMOMETHANE	ug/L	140	N/A	<1 U	N/A	<2000 U	<100 U	<2 U	N/A	<1 U	N/A	<1 U
CARBON DISULFIDE	ug/L	10000	N/A	<1 U	N/A	<2000 U	<100 U	<2 U	N/A	<1 U	N/A	<1 U
CARBON TETRACHLORIDE	ug/L	5	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
CHLOROBENZENE	ug/L	100	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
CHLOROETHANE	ug/L	41000	N/A	<1 U	N/A	<2000 U	<100 U	<2 U	N/A	<1 U	N/A	<1 U
CHLOROFORM	ug/L	1000	N/A	<0.25 U	N/A	<500 U	<25 U	2.05	N/A	0.938 J	N/A	<0.25 U
CHLOROMETHANE	ug/L	220	N/A	<1 U	N/A	<2000 U	<100 U	<2 U	N/A	<1 U	N/A	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	0.769 J	N/A	46300	99.5 J	3.21	N/A	40	N/A	8.92
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
DIBROMOMETHANE	ug/L	380	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	0.516 J	N/A	<0.5 U
ETHYLBENZENE	ug/L	700	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
m,p-Xylene	ug/L	10000	N/A	<1 U	N/A	<2000 U	<100 U	<2 U	N/A	<1 U	N/A	<1 U
METHYLENE CHLORIDE	ug/L	5	N/A	<0.5 U	N/A	484000	<50 U	<1 U	N/A	0.334 J	N/A	<0.5 U
NAPHTHALENE	ug/L	2000	N/A	<0.4 U	N/A	<800 UJ	<40 U	<0.8 U	N/A	<0.4 U	N/A	<0.4 U
N-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
N-PROPYLBENZENE	ug/L	4100	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
O-XYLENE	ug/L	10000	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
STYRENE	ug/L	100	N/A	<0.25 U	N/A	<500 U	<25 U	<0.5 U	N/A	<0.25 U	N/A	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
TETRACHLOROETHENE	ug/L	5	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	0.334 J	N/A	<0.5 U
TOLUENE	ug/L	1000	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	0.913 J	N/A	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<1 U	N/A	<2000 U	<100 U	<2 U	N/A	<1 U	N/A	<1 U
TRICHLOROETHENE	ug/L	5	N/A	12.1	N/A	30100	11500	288	N/A	231	N/A	22.5
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	<0.5 U	N/A	<0.5 U
VINYL CHLORIDE	ug/L	2	N/A	<0.5 U	N/A	<1000 U	<50 U	<1 U	N/A	9.33	N/A	1.87

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-37 Remedial Action Field Work
May/July 2014

Location ID: Sample Date:	Units	MCL/ MSC	35BWW23-070114 7/1/2014	37DPT08 (23-28)010514 5/1/2014	37DPT09 (23-28)020514 5/2/2014	37DPT10 (23-28)030514 5/3/2014	37DPT11 (23-28)210514 5/21/2014	37DPT12 (23-28)120514 5/12/2014	37DPT13 (23-28)130514 5/13/2014
ID Location:			Site 37 - NE, outside site boundary, S side of road between Buildings 35-B and 36-B. Sampled Quarterly	Site 37 - Central, just inside east site boundary, N of 35BWW14. Sampled Once	Site 37 - N, inside site boundary. Sampled Once	Site 37 - W, southwest corner of Goose Prairie Creek bridge. Sampled Once	Site 37 - N, outside site boundary. Sampled Once	Site 37 - NE, outside site boundary, S side of road S of Bldg. 35-B. Sampled Once	Site 37 - NE, outside site boundary, S side of road between Buildings 35-B and 36-B. Sampled Once
Volatile Organic Compounds (8260B)									
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	0.764 J	<0.25 U	<0.25 U	<0.25 U	1.84	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	9.14	<1 U	<1 U	<1 U	14.3	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<2 UJ	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U	<5 U	<5 UJ	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<5 U	<5 U	<5 U	<5 UJ	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	<5 U	<5 U	<5 UJ	<5 U	<5 U
ACETONE	ug/L	92000	<5 U	<5 U	<5 U	3.14 J	<5 UJ	8.64 J	4.23 J
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	1.83	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 UJ	<1 U	<1 UJ	<1 U	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	0.244 J	<0.25 U

LHAAP-37 Remedial Action Field Work
May/July 2014

Location ID: Sample Date:	Units	MCL/ MSC	35BWW23-070114 7/1/2014	37DPT08 (23-28)010514 5/1/2014	37DPT09 (23-28)020514 5/2/2014	37DPT10 (23-28)030514 5/3/2014	37DPT11 (23-28)210514 5/21/2014	37DPT12 (23-28)120514 5/12/2014	37DPT13 (23-28)130514 5/13/2014
ID Location:			Site 37 - NE, outside site boundary, S side of road between Buildings 35-B and 36-B. Sampled Quarterly	Site 37 - Central, just inside east site boundary, N of 35BWW14. Sampled Once	Site 37 - N, inside site boundary. Sampled Once	Site 37 - W, southwest corner of Goose Prairie Creek bridge. Sampled Once	Site 37 - N, outside site boundary. Sampled Once	Site 37 - NE, outside site boundary, S side of road S of Bldg. 35-B. Sampled Once	Site 37 - NE, outside site boundary, S side of road between Buildings 35-B and 36-B. Sampled Once
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	0.993 J
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	1.77	<0.5 U	<0.5 U	0.261 J	4.03	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.445 J	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	23	2.41	<0.5 U	<0.5 U	<0.5 UJ	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.784 J	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	45.3	34.6	<0.5 U	1.31	38.6	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	0.907 J	<0.5 U	<0.5 U	<0.5 U	1.05	<0.5 U

Blue Highlighting Indicates concentrations above the MCL/MSC

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-46 - Remedial Action Field Work
May/July 2014

Location ID: Sample Date:	Units	MCL/MSC	46DPT13 (43-48)030514 5/3/2014	46WW16- 070114 7/1/2014
ID Location:			Site 46 - N, inside site boundary. Intermediate Zone. Sampled Once	Site 46 - N, inside site boundary. Intermediate Zone. Sampled Once
Volatile Organic Compounds (8260B)				
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	2.59 J	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U
ACETONE	ug/L	92000	4.6 J	6.92 J
BENZENE	ug/L	5	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 UJ	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	0.694 J
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U

LHAAP-46 - Remedial Action Field Work
May/July 2014

Location ID: Sample Date:	Units	MCL/MSC	46DPT13 (43-48)030514 5/3/2014	46WW16-070114 7/1/2014
ID Location:			Site 46 - N, inside site boundary. Intermediate Zone. Sampled Once	Site 46 - N, inside site boundary. Intermediate Zone. Sampled Once
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

U - Undetected: The analyte was analyzed for, but not detected.

ug/L - micrograms per liter

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW05-062014 6/20/2014	50WW06-062514 6/25/2014	50WW06F-062514 6/25/2014	50WW07-032514 3/25/2014	50WW07-062014 6/20/2014	50WW08-062414 6/24/2014	50WW08F-062414 6/24/2014	50WW09-061914 6/19/2014	50WW10-061914 6/19/2014	50WW10FD-061914 6/19/2014	50WW11-062514 6/25/2014
ID Location:			Site 50 - NE, lower shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, inside site boundary. Sampled quarterly	Site 50 - E, intermediate, inside site boundary. Sampled quarterly	Site 50 - E, intermediate, inside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly
Alkalinity (310.2)													
ALKALINITY, TOTAL	mg/L		N/A	394	N/A	N/A	N/A	461	N/A	N/A	N/A	N/A	392
Phosphours (365.4)													
PHOSPHORUS	mg/L		N/A	0.623	N/A	N/A	N/A	0.337 J	N/A	N/A	N/A	N/A	0.504
Sulfide (376.1)													
SULFIDE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	4.9	N/A	N/A	N/A	9.32	N/A	N/A	N/A	N/A	5.03
Iron (6010C)													
IRON	mg/L		N/A	N/A	0.0645 J	N/A	N/A	N/A	<0.1 U	N/A	N/A	N/A	N/A
Manganese (6020A)													
MANGANESE	mg/L	14	N/A	N/A	0.0347	N/A	N/A	N/A	0.0441	N/A	N/A	N/A	N/A
Perchlorate (6850)													
PERCHLORATE	ug/L	72	20.5	700	N/A	<0.2 U	<0.2 U	132	N/A	<0.2 U	0.499	1.46	8910
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<2 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.8 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	1.68 J	N/A	<0.25 U	<0.25 U	<0.25 U	1.64 J
1,1-DICHLOROETHENE	ug/L	7	2.67	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	7.35
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	N/A	<0.3 U	<0.3 U	<1.5 U	N/A	<0.3 U	<0.3 U	<0.3 U	<0.6 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	<2 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<2 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.8 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	N/A	<2 U	<2 U	<10 U	N/A	<2 U	<2 U	<2 U	<4 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U
1,2-DICHLOROETHANE	ug/L	5	2.82	<0.5 U	N/A	<0.5 U	<0.5 U	4.36 J	N/A	<0.5 U	<0.5 U	<0.5 U	6.01
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<2 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.8 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<2 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.8 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	N/A	<5 U	<5 U	<25 U	N/A	<5 UJ	<5 UJ	<5 U	<10 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW05-062014 6/20/2014	50WW06-062514 6/25/2014	50WW06F-062514 6/25/2014	50WW07-032514 3/25/2014	50WW07-062014 6/20/2014	50WW08-062414 6/24/2014	50WW08F-062414 6/24/2014	50WW09-061914 6/19/2014	50WW10-061914 6/19/2014	50WW10FD-061914 6/19/2014	50WW11-062514 6/25/2014
ID Location:			Site 50 - NE, lower shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, inside site boundary. Sampled quarterly	Site 50 - E, intermediate, inside site boundary. Sampled quarterly	Site 50 - E, intermediate, inside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly
2-HEXANONE	ug/L	6100	<5 U	<5 U	N/A	<5 U	<5 U	<25 U	N/A	<5 UJ	<5 UJ	<5 U	<10 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	N/A	<5 U	<5 U	<25 U	N/A	<5 UJ	<5 UJ	<5 U	<10 U
ACETONE	ug/L	92000	<5 U	<5 U	N/A	<5 U	<5 U	<25 U	N/A	<5 UJ	<5 UJ	<5 U	<10 U
BENZENE	ug/L	5	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<2 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.8 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
BROMOFORM	ug/L	36	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	<2 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	<2 U
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	8.81	8.71	<2 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	0.151 J	<0.25 U	<0.25 U	<0.5 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	<2 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	<2 U
CIS-1,2-DICHLOROETHENE	ug/L	70	12.6	0.299 J	N/A	<0.5 U	<0.5 U	86	N/A	1.16	<0.5 U	<0.5 U	12.6
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	<2 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<2 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.8 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<1.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.5 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
TETRACHLOROETHENE	ug/L	5	1.48	<0.5 U	N/A	<0.5 U	<0.5 U	2.03 J	N/A	<0.5 U	<0.5 U	<0.5 U	0.678 J
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	N/A	<1 U	<1 U	<5 U	N/A	<1 U	<1 U	<1 U	<2 U
TRICHLOROETHENE	ug/L	5	270	27.4	N/A	<0.5 U	<0.5 U	814	N/A	36.3	<0.5 U	<0.5 U	831
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<1 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<2.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	0.516 J

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW05-062014 6/20/2014	50WW06-062514 6/25/2014	50WW06F-062514 6/25/2014	50WW07-032514 3/25/2014	50WW07-062014 6/20/2014	50WW08-062414 6/24/2014	50WW08F-062414 6/24/2014	50WW09-061914 6/19/2014	50WW10-061914 6/19/2014	50WW10FD-061914 6/19/2014	50WW11-062514 6/25/2014
ID Location:			Site 50 - NE, lower shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Sampled quarterly	Site 50 - ENE, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Sampled quarterly	Site 50 - E, upper shallow, inside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, inside site boundary. Sampled quarterly	Site 50 - E, intermediate, inside site boundary. Sampled quarterly	Site 50 - E, intermediate, inside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly
Inorganic Anions (9056)													
CHLORIDE	mg/L		N/A	262	N/A	N/A	N/A	338	N/A	N/A	N/A	N/A	286
NITRATE	mg/L	10	N/A	<3 U	N/A	N/A	N/A	<4 U	N/A	N/A	N/A	N/A	<3 U
NITRITE	mg/L	1	N/A	<3 U	N/A	N/A	N/A	<4 U	N/A	N/A	N/A	N/A	<3 U
SULFATE	mg/L		N/A	199	N/A	N/A	N/A	260	N/A	N/A	N/A	N/A	305
Dissolved Gases (RSK-175)													
CARBON DIOXIDE	ug/L		N/A	159000	N/A	N/A	N/A	194000	N/A	N/A	N/A	N/A	195000
ETHANE	ug/L		N/A	<2 U	N/A	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	<2 U
ETHENE	ug/L		N/A	<2 U	N/A	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	<2 U
METHANE	ug/L		N/A	<2 U	N/A	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	<2 U

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW11F-062514 6/25/2014	50WW12-062614 6/26/2014	50WW12F-062614 6/26/2014	50WW13-062514 6/25/2014	50WW13F-062514 6/25/2014	50WW14-062514 6/25/2014	50WW14F-062514 6/25/2014	50WW15-061914 6/19/2014	50WW16-032514 3/25/2014	50WW16-062614 6/26/2014	50WW16FD-062614 6/26/2014
ID Location:			Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Filtered. Sampled quarterly	Site 50 - NNE, upper shallow, outside site boundary, along Goose Prairie Creek bridge. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly
Alkalinity (310.2)													
ALKALINITY, TOTAL	mg/L		N/A	220	N/A	393	N/A	276	N/A	N/A	N/A	N/A	N/A
Phosphours (365.4)													
PHOSPHORUS	mg/L		N/A	0.146 J	N/A	0.271 J	N/A	0.115 J	N/A	N/A	N/A	N/A	N/A
Sulfide (376.1)													
SULFIDE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	3.54	N/A	3.95	N/A	3.86	N/A	N/A	N/A	N/A	N/A
Iron (6010C)													
IRON	mg/L		<0.1 U	N/A	<0.1 U	N/A	0.0677 J	N/A	7.99	N/A	N/A	N/A	N/A
Manganese (6020A)													
MANGANESE	mg/L	14	0.126	N/A	0.155	N/A	0.0945	N/A	0.783	N/A	N/A	N/A	N/A
Perchlorate (6850)													
PERCHLORATE	ug/L	72	N/A	35500	N/A	3110	N/A	0.121 J	N/A	<0.2 U	<0.2 U	0.725	0.682
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<0.4 U	N/A	<2 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	N/A	<0.25 U	N/A	2.17 J	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	N/A	<1 U	N/A	4.95 J	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<0.3 U	N/A	<1.5 U	N/A	<0.3 U	N/A	<0.3 U	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	N/A	<1 U	N/A	<5 UJ	N/A	<1 UJ	N/A	<1 U	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<0.4 U	N/A	<2 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<2 U	N/A	<10 UJ	N/A	<2 UJ	N/A	<2 U	<2 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	N/A	<0.5 U	N/A	10.6	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	N/A	<2 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	N/A	<0.4 U	N/A	<2 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	N/A	<5 U	N/A	<25 UJ	N/A	<5 UJ	N/A	<5 U	<5 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW11F-062514 6/25/2014	50WW12-062614 6/26/2014	50WW12F-062614 6/26/2014	50WW13-062514 6/25/2014	50WW13F-062514 6/25/2014	50WW14-062514 6/25/2014	50WW14F-062514 6/25/2014	50WW15-061914 6/19/2014	50WW16-032514 3/25/2014	50WW16-062614 6/26/2014	50WW16FD-062614 6/26/2014
ID Location:			Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Filtered. Sampled quarterly	Site 50 - NNE, upper shallow, outside site boundary, along Goose Prairie Creek bridge. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly
2-HEXANONE	ug/L	6100	N/A	<5 U	N/A	<25 UJ	N/A	<5 UJ	N/A	<5 U	<5 U	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	N/A	<0.5 UJ	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 UJ	<0.5 UJ
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<5 U	N/A	<25 UJ	N/A	<5 UJ	N/A	<5 U	<5 U	<5 U	<5 U
ACETONE	ug/L	92000	N/A	<5 U	N/A	<25 UJ	N/A	<5 UJ	N/A	<5 U	<5 U	<5 U	<5 U
BENZENE	ug/L	5	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	N/A	<0.4 U	N/A	<2 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	N/A	<1 U	N/A	<5 U	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	N/A	<1 U	N/A	<5 U	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	N/A	<1 U	N/A	<5 U	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	N/A	<1 U	N/A	<5 U	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
CHLOROFORM	ug/L	1000	N/A	<0.25 U	N/A	0.819 J	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	N/A	<1 U	N/A	<5 U	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	<0.5 U	N/A	56.3	N/A	0.826 J	N/A	12.9	0.548 J	0.471 J	0.456 J
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	N/A	<1 U	N/A	<5 U	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	N/A	<0.4 U	N/A	<2 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	N/A	<0.25 U	N/A	<1.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	N/A	<0.5 U	N/A	1.39 J	N/A	<0.5 U	N/A	3.05	<0.5 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<1 U	N/A	<5 U	N/A	<1 U	N/A	<1 U	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	N/A	0.411 J	N/A	1840	N/A	21.9	N/A	18.9	11.4	12	11.6
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	N/A	<0.5 U	N/A	<2.5 U	N/A	<0.5 U	N/A	2.76	<0.5 U	<0.5 U	<0.5 U

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW11F-062514 6/25/2014	50WW12-062614 6/26/2014	50WW12F-062614 6/26/2014	50WW13-062514 6/25/2014	50WW13F-062514 6/25/2014	50WW14-062514 6/25/2014	50WW14F-062514 6/25/2014	50WW15-061914 6/19/2014	50WW16-032514 3/25/2014	50WW16-062614 6/26/2014	50WW16FD-062614 6/26/2014
ID Location:			Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, along S. Crockett Ave. Filtered. Sampled quarterly	Site 50 - NNE, upper shallow, outside site boundary, along Goose Prairie Creek bridge. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly
Inorganic Anions (9056)													
CHLORIDE	mg/L		N/A	1040	N/A	360	N/A	373	N/A	N/A	N/A	N/A	N/A
NITRATE	mg/L	10	N/A	<2 U	N/A	<3 U	N/A	<4 U	N/A	N/A	N/A	N/A	N/A
NITRITE	mg/L	1	N/A	<2 U	N/A	<3 U	N/A	<4 U	N/A	N/A	N/A	N/A	N/A
SULFATE	mg/L		N/A	511	N/A	295	N/A	317	N/A	N/A	N/A	N/A	N/A
Dissolved Gases (RSK-175)													
CARBON DIOXIDE	ug/L		N/A	94000	N/A	62700	N/A	88500	N/A	N/A	N/A	N/A	N/A
ETHANE	ug/L		N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	N/A	N/A	N/A	N/A
ETHENE	ug/L		N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	N/A	N/A	N/A	N/A
METHANE	ug/L		N/A	<2 U	N/A	<2 U	N/A	6.27	N/A	N/A	N/A	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW17-032514 3/25/2014	50WW17-062014 6/20/2014	50WW18-032614 3/26/2014	50WW18F-032614 3/26/2014	50WW19-032514 3/25/2014	50WW19-062014 6/20/2014	50WW20-061914 6/19/2014	50WW21-032514 3/25/2014	50WW21-062014 6/20/2014	50WW21FD-062014 6/20/2014
ID Location:			Site 50 - NE, fully-penetrating shallow, outside site boundary, near Goose Prairie Creek.. Sampled quarterly	Site 50 - NE, fully-penetrating shallow, outside site boundary, near Goose Prairie Creek.. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Filtered. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly	Site 50 - E, fully-penetrating shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly
Alkalinity (310.2)												
ALKALINITY, TOTAL	mg/L		N/A	N/A	331	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phosphours (365.4)												
PHOSPHORUS	mg/L		N/A	N/A	<0.2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sulfide (376.1)												
SULFIDE	mg/L		N/A	N/A	<1 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Carbon (415.1)												
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	N/A	4.92	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Iron (6010C)												
IRON	mg/L		N/A	N/A	N/A	<0.1 U	N/A	N/A	N/A	N/A	N/A	N/A
Manganese (6020A)												
MANGANESE	mg/L	14	N/A	N/A	N/A	0.165	N/A	N/A	N/A	N/A	N/A	N/A
Perchlorate (6850)												
PERCHLORATE	ug/L	72	<0.2 U	1.76	<0.2 U	N/A	<0.2 U	0.48	<0.2 U	0.606	0.964	0.934
Volatile Organic Compounds (8260B)												
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	N/A	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	N/A	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW17-032514 3/25/2014	50WW17-062014 6/20/2014	50WW18-032614 3/26/2014	50WW18F-032614 3/26/2014	50WW19-032514 3/25/2014	50WW19-062014 6/20/2014	50WW20-061914 6/19/2014	50WW21-032514 3/25/2014	50WW21-062014 6/20/2014	50WW21FD-062014 6/20/2014
ID Location:			Site 50 - NE, fully-penetrating shallow, outside site boundary, near Goose Prairie Creek.. Sampled quarterly	Site 50 - NE, fully-penetrating shallow, outside site boundary, near Goose Prairie Creek.. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Filtered. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly	Site 50 - E, fully-penetrating shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly
2-HEXANONE	ug/L	6100	<5 U	<5 U	<5 U	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	<5 U	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U
ACETONE	ug/L	92000	<5 U	<5 U	<5 U	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	0.516 J	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: / Sample Date:	Units	MCL/ MSC	50WW17-032514 3/25/2014	50WW17-062014 6/20/2014	50WW18-032614 3/26/2014	50WW18F-032614 3/26/2014	50WW19-032514 3/25/2014	50WW19-062014 6/20/2014	50WW20-061914 6/19/2014	50WW21-032514 3/25/2014	50WW21-062014 6/20/2014	50WW21FD-062014 6/20/2014
ID Location:			Site 50 - NE, fully-penetrating shallow, outside site boundary, near Goose Prairie Creek.. Sampled quarterly	Site 50 - NE, fully-penetrating shallow, outside site boundary, near Goose Prairie Creek.. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Filtered. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly	Site 50 - ENE, fully-penetrating shallow, outside site boundary, near Site 67. Sampled quarterly	Site 50 - E, fully-penetrating shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly
Inorganic Anions (9056)												
CHLORIDE	mg/L		N/A	N/A	643	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NITRATE	mg/L	10	N/A	N/A	<0.8 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
NITRITE	mg/L	1	N/A	N/A	<0.8 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	mg/L		N/A	N/A	142	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dissolved Gases (RSK-175)												
CARBON DIOXIDE	ug/L		N/A	N/A	148000	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ETHANE	ug/L		N/A	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
ETHENE	ug/L		N/A	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A
METHANE	ug/L		N/A	N/A	1.35 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW22-062414 6/24/2014	50WW22F-062414 6/24/2014	50WW23-062614 6/26/2014	50WW23F-062614 6/26/2014	50WW24-032614 3/26/2014	50WW24-062614 6/26/2014	50WW24F-032614 3/26/2014	50WW24F-062614 6/26/2014	50WW25-032614 3/26/2014	50WW25-062414 6/24/2014	50WW25F-032614 3/26/2014
ID Location:			Site 50 - SE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - SE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Filtered. Sampled quarterly
Alkalinity (310.2)													
ALKALINITY, TOTAL	mg/L		387	N/A	235	N/A	314	312	N/A	N/A	275	N/A	N/A
Phosphours (365.4)													
PHOSPHORUS	mg/L		0.879	N/A	<0.2 U	N/A	0.317 J	<0.2 U	N/A	N/A	<0.2 U	<0.2 U	N/A
Sulfide (376.1)													
SULFIDE	mg/L		N/A	N/A	N/A	N/A	<1 U	N/A	N/A	N/A	<1 U	N/A	N/A
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TOC)	mg/L		11.3	N/A	4.86	N/A	4.78	3.97	N/A	N/A	4.12	6.19	N/A
Iron (6010C)													
IRON	mg/L		N/A	<0.1 U	N/A	0.089 J	N/A	N/A	<0.1 U	<0.1 U	N/A	N/A	0.754
Manganese (6020A)													
MANGANESE	mg/L	14	N/A	0.114	N/A	0.235	N/A	N/A	0.0097	0.00835	N/A	N/A	0.1
Perchlorate (6850)													
PERCHLORATE	ug/L	72	2.29	N/A	0.182 J	N/A	<0.2 U	110	N/A	N/A	9.13	31.8	N/A
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	N/A
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,1-DICHLOROETHANE	ug/L	10000	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
1,1-DICHLOROETHENE	ug/L	7	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	N/A	<0.3 U	N/A	<0.3 U	<0.3 U	N/A	N/A	<0.3 U	<0.3 U	N/A
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	N/A
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	N/A	<2 U	N/A	<2 U	<2 U	N/A	N/A	<2 U	<2 U	N/A
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	N/A
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	N/A
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
2-BUTANONE	ug/L	61000	<5 U	N/A	<5 U	N/A	<5 U	<5 U	N/A	N/A	<5 U	<5 U	N/A
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW22-062414 6/24/2014	50WW22F-062414 6/24/2014	50WW23-062614 6/26/2014	50WW23F-062614 6/26/2014	50WW24-032614 3/26/2014	50WW24-062614 6/26/2014	50WW24F-032614 3/26/2014	50WW24F-062614 6/26/2014	50WW25-032614 3/26/2014	50WW25-062414 6/24/2014	50WW25F-032614 3/26/2014
ID Location:			Site 50 - SE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - SE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Filtered. Sampled quarterly
2-HEXANONE	ug/L	6100	<5 U	N/A	<5 U	N/A	<5 U	<5 U	N/A	N/A	<5 U	<5 U	N/A
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	N/A	<0.5 UJ	N/A	<0.5 U	<0.5 UJ	N/A	N/A	<0.5 U	<0.5 U	N/A
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	N/A	<5 U	N/A	<5 U	<5 U	N/A	N/A	<5 U	<5 U	N/A
ACETONE	ug/L	92000	<5 U	N/A	<5 U	N/A	<5 U	<5 U	N/A	N/A	<5 U	3.07 J	N/A
BENZENE	ug/L	5	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
BROMOBENZENE	ug/L	2000	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	N/A
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
BROMOFORM	ug/L	36	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
BROMOMETHANE	ug/L	140	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
CARBON DISULFIDE	ug/L	10000	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	0.936 J	N/A
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
CHLOROBENZENE	ug/L	100	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
CHLOROETHANE	ug/L	41000	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
CHLOROFORM	ug/L	1000	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
CHLOROMETHANE	ug/L	220	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
DIBROMOMETHANE	ug/L	380	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
ETHYLBENZENE	ug/L	700	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
M,P-XYLENE	ug/L	10000	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
METHYLENE CHLORIDE	ug/L	5	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
NAPHTHALENE	ug/L	2000	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U	N/A	N/A	<0.4 U	<0.4 U	N/A
N-BUTYLBENZENE	ug/L	4100	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
N-PROPYLBENZENE	ug/L	4100	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
O-XYLENE	ug/L	10000	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
STYRENE	ug/L	100	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U	N/A	N/A	<0.25 U	<0.25 U	N/A
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
TETRACHLOROETHENE	ug/L	5	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
TOLUENE	ug/L	1000	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	N/A	<1 U	N/A	<1 U	<1 U	N/A	N/A	<1 U	<1 U	N/A
TRICHLOROETHENE	ug/L	5	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A
VINYL CHLORIDE	ug/L	2	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U	N/A	N/A	<0.5 U	<0.5 U	N/A

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW22-062414 6/24/2014	50WW22F-062414 6/24/2014	50WW23-062614 6/26/2014	50WW23F-062614 6/26/2014	50WW24-032614 3/26/2014	50WW24-062614 6/26/2014	50WW24F-032614 3/26/2014	50WW24F-062614 6/26/2014	50WW25-032614 3/26/2014	50WW25-062414 6/24/2014	50WW25F-032614 3/26/2014
ID Location:			Site 50 - SE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - SE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Sampled quarterly	Site 50 - E, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered. Sampled quarterly	Site 50 - ENE, upper shallow, outside site boundary. Filtered Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Sampled quarterly	Site 50 - N, intermediate, outside site boundary, along 52st Street. Filtered. Sampled quarterly
Inorganic Anions (9056)													
CHLORIDE	mg/L		826	N/A	1770	N/A	399	380	N/A	N/A	28.9	26	N/A
NITRATE	mg/L	10	<10 U	N/A	<2 U	N/A	<0.4 U	<3 UJ	N/A	N/A	<0.2 U	<0.4 U	N/A
NITRITE	mg/L	1	<10 U	N/A	<2 U	N/A	<0.4 U	<3 UJ	N/A	N/A	<0.2 U	<0.4 U	N/A
SULFATE	mg/L		499	N/A	43.6	N/A	125	85.8	N/A	N/A	77.3	64.5	N/A
Dissolved Gases (RSK-175)													
CARBON DIOXIDE	ug/L		208000	N/A	104000	N/A	146000	181000	N/A	N/A	<5000 U	148000	N/A
ETHANE	ug/L		<2 U	N/A	<2 U	N/A	<2 U	<2 U	N/A	N/A	<2 U	<2 U	N/A
ETHENE	ug/L		<2 U	N/A	<2 U	N/A	<2 U	<2 U	N/A	N/A	<2 U	<2 U	N/A
METHANE	ug/L		<2 U	N/A	1.01 J	N/A	<2 U	<2 U	N/A	N/A	<2 U	54.3	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW25F-062414 6/24/2014	50WW26-032614 3/26/2014	50WW26-062014 6/20/2014	50WW26FD-032614 3/26/2014	50WW27-061914 6/19/2014	50WW18-062414 6/24/2014	50WW18F-062414 6/24/2014	50DPT14(13-18)010514 5/1/2014
ID Location:			Site 50 - N, intermediate, outside site boundary, along 52st Street. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - N, upper shallow, outside site boundary, east of S. Crockett Ave. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Filtered. Sampled quarterly	Site 50 - N, S side of 51st St., outside site boundary. Sampled Once
Alkalinity (310.2)										
ALKALINITY, TOTAL	mg/L		N/A	N/A	N/A	N/A	N/A	346	N/A	N/A
Phosphours (365.4)										
PHOSPHORUS	mg/L		N/A	N/A	N/A	N/A	N/A	<0.2 U	N/A	N/A
Sulfide (376.1)										
SULFIDE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Organic Carbon (415.1)										
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	N/A	N/A	N/A	N/A	6.71	N/A	N/A
Iron (6010C)										
IRON	mg/L		0.0615 J	N/A	N/A	N/A	N/A	N/A	<0.1 U	N/A
Manganese (6020A)										
MANGANESE	mg/L	14	0.0361	N/A	N/A	N/A	N/A	N/A	0.0809	N/A
Perchlorate (6850)										
PERCHLORATE	ug/L	72	N/A	<0.2 U	<0.2 U	<0.2 U	<0.2 U	0.172 J	N/A	N/A
Volatile Organic Compounds (8260B)										
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	N/A	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<2 U	<2 U	<2 U	<2 U	<2 U	N/A	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
2-BUTANONE	ug/L	61000	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	N/A	<5 U
2-CHLOROTOLUENE	ug/L	2000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW25F-062414 6/24/2014	50WW26-032614 3/26/2014	50WW26-062014 6/20/2014	50WW26FD-032614 3/26/2014	50WW27-061914 6/19/2014	50WW18-062414 6/24/2014	50WW18F-062414 6/24/2014	50DPT14(13-18)010514 5/1/2014
ID Location:			Site 50 - N, intermediate, outside site boundary, along 52st Street. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - N, upper shallow, outside site boundary, east of S. Crockett Ave. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Filtered. Sampled quarterly	Site 50 - N, S side of 51st St., outside site boundary. Sampled Once
2-HEXANONE	ug/L	6100	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	N/A	<5 U
4-CHLOROTOLUENE	ug/L	2000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	N/A	<5 U
ACETONE	ug/L	92000	N/A	<5 U	<5 U	<5 U	<5 U	<5 U	N/A	2.73 J
BENZENE	ug/L	5	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
BROMOBENZENE	ug/L	2000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
BROMOFORM	ug/L	36	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U
BROMOMETHANE	ug/L	140	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 UJ
CARBON DISULFIDE	ug/L	10000	N/A	<1 U	<1 U	0.556 J	<1 U	<1 U	N/A	<1 U
CARBON TETRACHLORIDE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
CHLOROBENZENE	ug/L	100	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
CHLOROETHANE	ug/L	41000	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U
CHLOROFORM	ug/L	1000	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
CHLOROMETHANE	ug/L	220	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	<0.5 U	<0.5 U	<0.5 U	0.871 J	<0.5 U	N/A	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
DIBROMOMETHANE	ug/L	380	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
ETHYLBENZENE	ug/L	700	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
M,P-XYLENE	ug/L	10000	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U
METHYLENE CHLORIDE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
NAPHTHALENE	ug/L	2000	N/A	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	N/A	<0.4 U
N-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
N-PROPYLBENZENE	ug/L	4100	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
O-XYLENE	ug/L	10000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
STYRENE	ug/L	100	N/A	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	N/A	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
TETRACHLOROETHENE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
TOLUENE	ug/L	1000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<1 U	<1 U	<1 U	<1 U	<1 U	N/A	<1 U
TRICHLOROETHENE	ug/L	5	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	N/A	<0.5 U
VINYL CHLORIDE	ug/L	2	N/A	<0.5 U	<0.5 U	<0.5 U	0.251 J	<0.5 U	N/A	<0.5 U

LHAAP-50
Quarterly MNA Sampling (March/June 2014) / Remedial Action Field Work (May 2014)

Location ID: Sample Date:	Units	MCL/ MSC	50WW25F-062414 6/24/2014	50WW26-032614 3/26/2014	50WW26-062014 6/20/2014	50WW26FD-032614 3/26/2014	50WW27-061914 6/19/2014	50WW18-062414 6/24/2014	50WW18F-062414 6/24/2014	50DPT14(13-18)010514 5/1/2014
ID Location:			Site 50 - N, intermediate, outside site boundary, along 52st Street. Filtered. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - E, lower shallow, outside site boundary, east side of S. Crockett Ave. Sampled quarterly	Site 50 - N, upper shallow, outside site boundary, east of S. Crockett Ave. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Sampled quarterly	Site 50 - NE, upper shallow, outside site boundary, along Goose Prairie Creek. Filtered. Sampled quarterly	Site 50 - N, S side of 51st St., outside site boundary. Sampled Once
Inorganic Anions (9056)										
CHLORIDE	mg/L		N/A	N/A	N/A	N/A	N/A	559	N/A	N/A
NITRATE	mg/L	10	N/A	N/A	N/A	N/A	N/A	<10 U	N/A	N/A
NITRITE	mg/L	1	N/A	N/A	N/A	N/A	N/A	<10 U	N/A	N/A
SULFATE	mg/L		N/A	N/A	N/A	N/A	N/A	87.6 J	N/A	N/A
Dissolved Gases (RSK-175)										
CARBON DIOXIDE	ug/L		N/A	N/A	N/A	N/A	N/A	187000	N/A	N/A
ETHANE	ug/L		N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
ETHENE	ug/L		N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
METHANE	ug/L		N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	03WW01-052114 5/21/2014	03WW01F-052114 5/21/2014	1004TW001-052914 5/29/2014	35ASW03-052814 5/28/2014	35AWW01-052914 5/29/2014	35AWW01F-052914 5/29/2014	35AWW05-05221402 5/22/2014	35AWW05FD-052214 5/22/2014	35AWW06-052114 5/21/2014	35AWW06F-052114 5/21/2014	35AWW07RF-052914 5/29/2014
ID Location:			Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly, arsenic only.	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Filtered. Sampled quarterly	Site 58 - ENE, outside site boundary. Replacement Well for 35AWW07. Sampled quarterly
Alkalinity (310.2)													
ALKALINITY, TOTAL	mg/L		25700	N/A	N/A	N/A	N/A	N/A	N/A	N/A	718	N/A	N/A
Phosphorus (365.4)													
PHOSPHORUS	mg/L		22.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.2 U	N/A	N/A
Sulfide (376.1)													
SULFIDE	mg/L		0.663 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1 U	N/A	N/A
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TOC)	mg/L		29100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7.25	N/A	N/A
Metals (6010C)													
IRON	mg/L		70.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.166 J	N/A	N/A
Ferrous Iron (SM3500FE)													
FERROUS IRON	mg/L		0.217 J	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.04 U	N/A	N/A
Metals (6020A)													
ARSENIC	mg/L	0.01	0.0891	N/A	0.0148	N/A	N/A	0.00134 J	N/A	N/A	0.00718	N/A	0.000798 J
MANGANESE, TOTAL	mg/L	14	40.1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.125	N/A	N/A
MANGANESE, DISSOLVED	mg/L	14	N/A	44.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0916	N/A
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,1,1-TRICHLOROETHANE	ug/L	200	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<4 U	N/A	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A
1,1,2-TRICHLOROETHANE	ug/L	5	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,1-DICHLOROETHANE	ug/L	10000	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	1.94	N/A	N/A
1,1-DICHLOROETHENE	ug/L	7	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	12	N/A	N/A
1,1-DICHLOROPROPENE	ug/L	2.9	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,2,3-TRICHLOROBENZENE	ug/L	310	<3 U	N/A	N/A	<0.3 U	<0.3 U	N/A	<0.3 U	<0.3 U	<0.3 U	N/A	N/A
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
1,2,4-TRICHLOROBENZENE	ug/L	70	<4 U	N/A	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<20 U	N/A	N/A	<2 U	<2 U	N/A	<2 U	<2 U	<2 U	N/A	N/A
1,2-DIBROMOETHANE	ug/L	0.005	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,2-DICHLOROBENZENE	ug/L	600	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
1,2-DICHLOROETHANE	ug/L	5	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,2-DICHLOROPROPANE	ug/L	5	<4 U	N/A	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,3-DICHLOROBENZENE	ug/L	3100	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
1,3-DICHLOROPROPANE	ug/L	29	<4 U	N/A	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A
1,4-DICHLOROBENZENE	ug/L	75	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	03WW01-052114 5/21/2014	03WW01F-052114 5/21/2014	1004TW001-052914 5/29/2014	35ASW03-052814 5/28/2014	35AWW01-052914 5/29/2014	35AWW01F-052914 5/29/2014	35AWW05-05221402 5/22/2014	35AWW05FD-052214 5/22/2014	35AWW06-052114 5/21/2014	35AWW06F-052114 5/21/2014	35AWW07RF-052914 5/29/2014
ID Location:			Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly, arsenic only.	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Filtered. Sampled quarterly	Site 58 - ENE, outside site boundary. Replacement Well for 35AWW07. Sampled quarterly
2,2-DICHLOROPROPANE	ug/L	42	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
2-BUTANONE	ug/L	61000	23900	N/A	N/A	<5 U	<5 U	N/A	<5 U	<5 U	<5 UJ	N/A	N/A
2-CHLOROTOLUENE	ug/L	2000	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
2-HEXANONE	ug/L	6100	<50 UJ	N/A	N/A	<5 U	<5 U	N/A	<5 UJ	<5 UJ	<5 UJ	N/A	N/A
4-CHLOROTOLUENE	ug/L	2000	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
4-METHYL-2-PENTANONE	ug/L	8200	<50 UJ	N/A	N/A	<5 U	<5 U	N/A	<5 U	<5 U	<5 UJ	N/A	N/A
ACETONE	ug/L	92000	10900	N/A	N/A	5.08 J	<5 U	N/A	<5 U	<5 U	<5 UJ	N/A	N/A
BENZENE	ug/L	5	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
BROMOBENZENE	ug/L	2000	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
BROMOCHLOROMETHANE	ug/L	4100	<4 U	N/A	N/A	<0.4 U	<0.4 U	N/A	<0.4 U	<0.4 U	<0.4 U	N/A	N/A
BROMODICHLOROMETHANE	ug/L	4.6	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
BROMOFORM	ug/L	36	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
BROMOMETHANE	ug/L	140	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
CARBON DISULFIDE	ug/L	10000	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
CARBON TETRACHLORIDE	ug/L	5	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
CHLOROBENZENE	ug/L	100	2.26 J	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
CHLOROETHANE	ug/L	41000	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
CHLOROFORM	ug/L	1000	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
CHLOROMETHANE	ug/L	220	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
CIS-1,2-DICHLOROETHENE	ug/L	70	3.3 J	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
DIBROMOCHLOROMETHANE	ug/L	34	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
DIBROMOMETHANE	ug/L	380	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
DICHLORODIFLUOROMETHANE	ug/L	20000	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
ETHYLBENZENE	ug/L	700	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
HEXACHLOROBUTADIENE	ug/L	20	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
ISOPROPYLBENZENE	ug/L	1000	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
M,P-XYLENE	ug/L	10000	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
METHYLENE CHLORIDE	ug/L	5	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
NAPHTHALENE	ug/L	2000	<4 U	N/A	N/A	<0.4 U	<0.4 U	N/A	<0.4 UJ	<0.4 U	<0.4 U	N/A	N/A
N-BUTYLBENZENE	ug/L	4100	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
N-PROPYLBENZENE	ug/L	4100	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
O-XYLENE	ug/L	10000	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
P-ISOPROPYLTOLUENE	ug/L	10000	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
SEC-BUTYLBENZENE	ug/L	4100	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
STYRENE	ug/L	100	<2.5 U	N/A	N/A	<0.25 U	<0.25 U	N/A	<0.25 U	<0.25 U	<0.25 U	N/A	N/A
TERT-BUTYLBENZENE	ug/L	4100	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
TETRACHLOROETHENE	ug/L	5	154	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
TOLUENE	ug/L	1000	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
TRANS-1,2-DICHLOROETHENE	ug/L	100	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<10 U	N/A	N/A	<1 U	<1 U	N/A	<1 U	<1 U	<1 U	N/A	N/A
TRICHLOROETHENE	ug/L	5	71.2	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
TRICHLOROFLUOROMETHANE	ug/L	31000	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A
VINYL CHLORIDE	ug/L	2	<5 U	N/A	N/A	<0.5 U	<0.5 U	N/A	<0.5 U	<0.5 U	<0.5 U	N/A	N/A

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	03WW01-052114 5/21/2014	03WW01F-052114 5/21/2014	1004TW001-052914 5/29/2014	35ASW03-052814 5/28/2014	35AWW01-052914 5/29/2014	35AWW01F-052914 5/29/2014	35AWW05-05221402 5/22/2014	35AWW05FD-052214 5/22/2014	35AWW06-052114 5/21/2014	35AWW06F-052114 5/21/2014	35AWW07RF-052914 5/29/2014
ID Location:			Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly, arsenic only.	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Sampled quarterly	Site 58 - SW, outside the site boundary. Filtered. Sampled quarterly	Site 58 - ENE, outside site boundary. Replacement Well for 35AWW07. Sampled quarterly
Volatile Fatty Acids (830-MBA)													
Acetic Acid	mg/L		4700	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Butyric Acid	mg/L		4920	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lactic Acid	mg/L		3010	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Propionic Acid	mg/L	51	2070	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pyruvic Acid	mg/L		<10 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inorganic Anions (9056)													
CHLORIDE	mg/L		780	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10.6	N/A	N/A
NITRATE	mg/L	10	<10 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5 U	N/A	N/A
NITRITE	mg/L	1	<10 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5 U	N/A	N/A
SULFATE	mg/L		376	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1550	N/A	N/A
Dissolved Gases (RSK-175)													
CARBON DIOXIDE	ug/L		564000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	109000	N/A	N/A
ETHANE	ug/L		<2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
ETHENE	ug/L		<2 U	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A
METHANE	ug/L		479	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	35AWW07RFFD-052914 5/29/2014	35AWW08-052014 5/20/2014	35AWW08F-052014DL02 5/20/2014	35AWW09-052014 5/20/2014	35AWW09F-052014 5/20/2014	35AWW10-052014 5/20/2014	35AWW10F-052014 5/20/2014	35AWW11-052114 5/21/2014	35AWW11F-052114 5/21/2014	35AWW12-052914 5/29/2014	35AWW13-052214 5/22/2014
ID Location:			Site 58 - ENE, outside site boundary. Replacement Well for 35AWW07. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - ESE, inside site boundary. Sampled quarterly	Site 58 - ESE, inside site boundary. Filtered. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly	Site 58 - SE, inside site boundary. Filtered. Sampled quarterly	Site 58 - E, outside site boundary. Sampled quarterly	Site 58 - NE, inside site boundary. Sampled quarterly
Alkalinity (310.2)													
ALKALINITY, TOTAL	mg/L		N/A	18300	N/A	245	N/A	80.3	N/A	416	N/A	N/A	N/A
Phosphorus (365.4)													
PHOSPHORUS	mg/L		N/A	69.1	N/A	<0.2 U	N/A	<0.2 U	N/A	1.38	N/A	N/A	N/A
Sulfide (376.1)													
SULFIDE	mg/L		N/A	5.11	N/A	<1 U	N/A	<1 U	N/A	0.791 J	N/A	N/A	N/A
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	16900	N/A	7.89	N/A	5.18	N/A	16.3	N/A	N/A	N/A
Metals (6010C)													
IRON	mg/L		N/A	118	N/A	0.279	N/A	0.836	N/A	N/A	0.0928 J	N/A	N/A
Ferrous Iron (SM3500FE)													
FERROUS IRON	mg/L		N/A	<800 U	N/A	<0.04 U	N/A	<0.04 U	N/A	<0.04 U	N/A	N/A	N/A
Metals (6020A)													
ARSENIC	mg/L	0.01	0.000992 J	0.143	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE, TOTAL	mg/L	14	N/A	81.9	N/A	0.183	N/A	0.585	N/A	N/A	0.569	N/A	N/A
MANGANESE, DISSOLVED	mg/L	14	N/A	N/A	57.9	N/A	0.176	N/A	0.0477	N/A	0.55	N/A	N/A
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L	110	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	N/A	<4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	N/A	<2.5 U	N/A	0.593 J	N/A	<0.25 U	N/A	0.351 J	N/A	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	11.6	N/A	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	N/A	<3 U	N/A	<0.3 U	N/A	<0.3 U	N/A	<0.3 U	N/A	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	N/A	<4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	N/A	<20 U	N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	N/A	<4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	N/A	<4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	35AWW07RFFD-052914 5/29/2014	35AWW08-052014 5/20/2014	35AWW08F-052014DL02 5/20/2014	35AWW09-052014 5/20/2014	35AWW09F-052014 5/20/2014	35AWW10-052014 5/20/2014	35AWW10F-052014 5/20/2014	35AWW11-052114 5/21/2014	35AWW11F-052114 5/21/2014	35AWW12-052914 5/29/2014	35AWW13-052214 5/22/2014
ID Location:			Site 58 - ENE, outside site boundary. Replacement Well for 35AWW07. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - ESE, inside site boundary. Sampled quarterly	Site 58 - ESE, inside site boundary. Filtered. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly	Site 58 - SE, inside site boundary. Filtered. Sampled quarterly	Site 58 - E, outside site boundary. Sampled quarterly	Site 58 - NE, inside site boundary. Sampled quarterly
2,2-DICHLOROPROPANE	ug/L	42	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	N/A	1450	N/A	<5 U	N/A	<5 U	N/A	<5 UJ	N/A	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	N/A	<50 U	N/A	<5 U	N/A	<5 U	N/A	<5 UJ	N/A	<5 U	<5 UJ
4-CHLOROTOLUENE	ug/L	2000	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	N/A	<50 U	N/A	<5 U	N/A	<5 U	N/A	<5 UJ	N/A	<5 U	<5 U
ACETONE	ug/L	92000	N/A	6380	N/A	<5 U	N/A	<5 U	N/A	<5 UJ	N/A	<5 U	<5 U
BENZENE	ug/L	5	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	N/A	<4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
BROMOMETHANE	ug/L	140	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
CHLOROFORM	ug/L	1000	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	N/A	47.2	N/A	0.502 J	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	N/A	<4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	N/A	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
STYRENE	ug/L	100	N/A	<2.5 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	N/A	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	N/A	204	N/A	128	N/A	0.401 J	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	N/A	2.82 J	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	N/A	<10 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	N/A	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	N/A	953	N/A	41.7	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	N/A	<5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	N/A	<0.5 U	<0.5 U

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	35AWW07RFFD-052914 5/29/2014	35AWW08-052014 5/20/2014	35AWW08F-052014DL02 5/20/2014	35AWW09-052014 5/20/2014	35AWW09F-052014 5/20/2014	35AWW10-052014 5/20/2014	35AWW10F-052014 5/20/2014	35AWW11-052114 5/21/2014	35AWW11F-052114 5/21/2014	35AWW12-052914 5/29/2014	35AWW13-052214 5/22/2014
ID Location:			Site 58 - ENE, outside site boundary. Replacement Well for 35AWW07. Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered Sampled quarterly	Site 58 - E, inside site boundary. Sampled quarterly	Site 58 - E, inside site boundary. Filtered. Sampled quarterly	Site 58 - ESE, inside site boundary. Sampled quarterly	Site 58 - ESE, inside site boundary. Filtered. Sampled quarterly	Site 58 - SE, inside site boundary. Sampled quarterly	Site 58 - SE, inside site boundary. Filtered. Sampled quarterly	Site 58 - E, outside site boundary. Sampled quarterly	Site 58 - NE, inside site boundary. Sampled quarterly
Volatile Fatty Acids (830-MBA)													
Acetic Acid	mg/L		N/A	3320	N/A	<1 U	N/A	<1 U	N/A	N/A	N/A	N/A	N/A
Butyric Acid	mg/L		N/A	7420	N/A	<1 U	N/A	<1 U	N/A	N/A	N/A	N/A	N/A
Lactic Acid	mg/L		N/A	2510	N/A	<1 U	N/A	<1 U	N/A	N/A	N/A	N/A	N/A
Propionic Acid	mg/L	51	N/A	668 J	N/A	<10 U	N/A	<10 U	N/A	N/A	N/A	N/A	N/A
Pyruvic Acid	mg/L		N/A	<10 U	N/A	<0.1 U	N/A	<0.1 U	N/A	N/A	N/A	N/A	N/A
Inorganic Anions (9056)													
CHLORIDE	mg/L		N/A	1590	N/A	1600	N/A	10.3	N/A	13.8	N/A	N/A	N/A
NITRATE	mg/L	10	N/A	<10 U	N/A	<2 U	N/A	<0.2 U	N/A	<5 U	N/A	N/A	N/A
NITRITE	mg/L	1	N/A	<10 U	N/A	<2 U	N/A	<0.2 U	N/A	<5 U	N/A	N/A	N/A
SULFATE	mg/L		N/A	262	N/A	1070	N/A	69.2	N/A	1220	N/A	N/A	N/A
Dissolved Gases (RSK-175)													
CARBON DIOXIDE	ug/L		N/A	N/A	N/A	155000	N/A	140000	N/A	234000	N/A	N/A	N/A
ETHANE	ug/L		N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	N/A	N/A
ETHENE	ug/L		N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	<2 U	N/A	N/A	N/A
METHANE	ug/L		N/A	N/A	N/A	11.5	N/A	<2 U	N/A	<2 U	N/A	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	35AWW14-052814 5/28/2014	35AWW14FD-052814 5/28/2014	35AWW15-052814 5/28/2014	35AWW16-052814 5/28/2014	35AWW17-052914 5/29/2014	35AWW18-052914 5/29/2014	35AWW19-052814 5/28/2014	35AWW20-052114 5/21/2014	35AWW20F-052114 5/21/2014	35AWW21-05221402 5/22/2014	35AWW22-052914 5/29/2014
ID Location:			Site 58 - SE, outside site boundary. Sampled quarterly	Site 58 - SE, outside site boundary. Sampled quarterly	Site 58 - W, inside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary, near Building 744-A. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Filtered. Sampled quarterly	Site 58 - ESE, outside site boundary, beside Building 725. Sampled quarterly	Site 58 - ENE, outside site boundary. Sampled quarterly
Alkalinity (310.2)													
ALKALINITY, TOTAL	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	831	N/A	N/A	N/A
Phosphorus (365.4)													
PHOSPHORUS	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.2 U	N/A	N/A	N/A
Sulfide (376.1)													
SULFIDE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.16	N/A	N/A	N/A
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	16.3	N/A	N/A	N/A
Metals (6010C)													
IRON	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0938 J	N/A	N/A
Ferrous Iron (SM3500FE)													
FERROUS IRON	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	<0.04 U	N/A	N/A	N/A
Metals (6020A)													
ARSENIC	mg/L	0.01	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MANGANESE, TOTAL	mg/L	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.05	N/A	N/A
MANGANESE, DISSOLVED	mg/L	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.06	N/A	N/A
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<8 U	N/A	<0.4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	49.3	N/A	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	2.54	2.48	<0.25 U	<0.25 U	<0.25 U	0.352 J	2.29	411	N/A	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	1.22 J	1.07 J	<1 U	<1 U	<1 U	<1 U	9.98	5060	N/A	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<6 U	N/A	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<8 U	N/A	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	<40 U	N/A	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	5.37 J	N/A	<0.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	2.86	15.9 J	N/A	<0.5 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<8 U	N/A	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<8 U	N/A	<0.4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<5 U	N/A	<0.25 U	<0.25 U

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	35AWW14-052814 5/28/2014	35AWW14FD-052814 5/28/2014	35AWW15-052814 5/28/2014	35AWW16-052814 5/28/2014	35AWW17-052914 5/29/2014	35AWW18-052914 5/29/2014	35AWW19-052814 5/28/2014	35AWW20-052114 5/21/2014	35AWW20F-052114 5/21/2014	35AWW21-05221402 5/22/2014	35AWW22-052914 5/29/2014
ID Location:			Site 58 - SE, outside site boundary. Sampled quarterly	Site 58 - SE, outside site boundary. Sampled quarterly	Site 58 - W, inside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary, near Building 744-A. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Filtered. Sampled quarterly	Site 58 - ESE, outside site boundary, beside Building 725. Sampled quarterly	Site 58 - ENE, outside site boundary. Sampled quarterly
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<100 UJ	N/A	<5 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<5 U	N/A	<0.25 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<100 UJ	N/A	<5 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<100 UJ	N/A	<5 U	<5 U
ACETONE	ug/L	92000	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	<100 UJ	N/A	<5 U	<5 U
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	5 J	N/A	<0.25 U	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<5 U	N/A	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<8 U	N/A	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	11.4 J	N/A	<0.25 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<5 U	N/A	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	1.46	1.47	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	110	N/A	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<8 U	N/A	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<5 U	N/A	<0.25 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<5 U	N/A	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	<20 U	N/A	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	0.612 J	0.565 J	<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.596 J	695	N/A	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<10 U	N/A	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	65.7	N/A	<0.5 U	<0.5 U

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	35AWW14-052814 5/28/2014	35AWW14FD-052814 5/28/2014	35AWW15-052814 5/28/2014	35AWW16-052814 5/28/2014	35AWW17-052914 5/29/2014	35AWW18-052914 5/29/2014	35AWW19-052814 5/28/2014	35AWW20-052114 5/21/2014	35AWW20F-052114 5/21/2014	35AWW21-05221402 5/22/2014	35AWW22-052914 5/29/2014
ID Location:			Site 58 - SE, outside site boundary. Sampled quarterly	Site 58 - SE, outside site boundary. Sampled quarterly	Site 58 - W, inside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary, near Building 744-A. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - SSW, outside site boundary. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Sampled quarterly	Site 58 - SW, inside site boundary, between Building 716 and 113. Filtered. Sampled quarterly	Site 58 - ESE, outside site boundary, beside Building 725. Sampled quarterly	Site 58 - ENE, outside site boundary. Sampled quarterly
Volatile Fatty Acids (830-MBA)													
Acetic Acid	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Butyric Acid	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lactic Acid	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Propionic Acid	mg/L	51	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pyruvic Acid	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Inorganic Anions (9056)													
CHLORIDE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	9.88	N/A	N/A	N/A
NITRATE	mg/L	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5 U	N/A	N/A	N/A
NITRITE	mg/L	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<5 U	N/A	N/A	N/A
SULFATE	mg/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	2420	N/A	N/A	N/A
Dissolved Gases (RSK-175)													
CARBON DIOXIDE	ug/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	221000	N/A	N/A	N/A
ETHANE	ug/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A	N/A
ETHENE	ug/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	<2 U	N/A	N/A	N/A
METHANE	ug/L		N/A	N/A	N/A	N/A	N/A	N/A	N/A	45.5	N/A	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	LHSMW06-052814 5/28/2014	LHSMW07-052214 5/22/2014	LHSMW07F-052214DL01 5/22/2014
ID Location:			Site 58 - SW, inside site boundary, beside Building 715. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary. Filtered. Sampled quarterly
Alkalinity (310.2)					
ALKALINITY, TOTAL	mg/L		N/A	803	N/A
Phosphorus (365.4)					
PHOSPHORUS	mg/L		N/A	<0.2 U	N/A
Sulfide (376.1)					
SULFIDE	mg/L		N/A	<1 U	N/A
Total Organic Carbon (415.1)					
TOTAL ORGANIC CARBON (TOC)	mg/L		N/A	11.6	N/A
Metals (6010C)					
IRON	mg/L		N/A	2.83	N/A
Ferrous Iron (SM3500FE)					
FERROUS IRON	mg/L		N/A	<0.04 U	N/A
Metals (6020A)					
ARSENIC	mg/L	0.01	0.00985	0.017	N/A
MANGANESE, TOTAL	mg/L	14	N/A	0.155	N/A
MANGANESE, DISSOLVED	mg/L	14	N/A	N/A	0.132
Volatile Organic Compounds (8260B)					
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	N/A
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	N/A
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	N/A
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	1.02	N/A
1,1-DICHLOROETHANE	ug/L	10000	1.74	48.8	N/A
1,1-DICHLOROETHENE	ug/L	7	1.68 J	558 J	N/A
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	N/A
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	N/A
1,2,3-TRICHLOROPROPANE	ug/L	0.0041	<1 U	<1 U	N/A
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	N/A
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	N/A
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	N/A
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	N/A
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	N/A
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	1.06	N/A
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	N/A
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	N/A
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	N/A
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	N/A
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	N/A

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	LHSMW06-052814 5/28/2014	LHSMW07-052214 5/22/2014	LHSMW07F-052214DL01 5/22/2014
ID Location:			Site 58 - SW, inside site boundary, beside Building 715. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary. Filtered. Sampled quarterly
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	N/A
2-BUTANONE	ug/L	61000	<5 U	<5 U	N/A
2-CHLOROTOLUENE	ug/L	2000	<0.25 U	<0.25 U	N/A
2-HEXANONE	ug/L	6100	<5 U	<5 UJ	N/A
4-CHLOROTOLUENE	ug/L	2000	<0.5 U	<0.5 U	N/A
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	N/A
ACETONE	ug/L	92000	<5 U	<5 U	N/A
BENZENE	ug/L	5	<0.25 U	0.422 J	N/A
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	N/A
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	N/A
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	N/A
BROMOFORM	ug/L	36	<1 U	<1 U	N/A
BROMOMETHANE	ug/L	140	<1 U	<1 U	N/A
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	N/A
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	N/A
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	N/A
CHLOROETHANE	ug/L	41000	<1 U	<1 U	N/A
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	N/A
CHLOROMETHANE	ug/L	220	<1 U	<1 U	N/A
CIS-1,2-DICHLOROETHENE	ug/L	70	2.59	7.17	N/A
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	N/A
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	N/A
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	N/A
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	N/A
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	N/A
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	N/A
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	N/A
M,P-XYLENE	ug/L	10000	<1 U	<1 U	N/A
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	N/A
NAPHTHALENE	ug/L	2000	<0.4 U	<0.4 U	N/A
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	N/A
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	N/A
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	N/A
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	N/A
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	N/A
STYRENE	ug/L	100	<0.25 U	<0.25 U	N/A
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	N/A
TETRACHLOROETHENE	ug/L	5	0.255 J	<0.5 U	N/A
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	N/A
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	0.296 J	N/A
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	N/A
TRICHLOROETHENE	ug/L	5	1.41	23.1	N/A
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	N/A
VINYL CHLORIDE	ug/L	2	0.597 J	7.98	N/A

LHAAP-58 - Quarterly MNA Sampling
May 2014

Location ID: Sample Date:	Units	MCL/ MSC	LHSMW06-052814 5/28/2014	LHSMW07-052214 5/22/2014	LHSMW07F-052214DL01 5/22/2014
ID Location:			Site 58 - SW, inside site boundary, beside Building 715. Sampled quarterly	Site 58 - SW, outside site boundary. Sampled quarterly	Site 58 - SW, outside site boundary. Filtered. Sampled quarterly
Volatile Fatty Acids (830-MBA)					
Acetic Acid	mg/L		N/A	N/A	N/A
Butyric Acid	mg/L		N/A	N/A	N/A
Lactic Acid	mg/L		N/A	N/A	N/A
Propionic Acid	mg/L	51	N/A	N/A	N/A
Pyruvic Acid	mg/L		N/A	N/A	N/A
Inorganic Anions (9056)					
CHLORIDE	mg/L		N/A	2460 U	N/A
NITRATE	mg/L	10	N/A	<40 U	N/A
NITRITE	mg/L	1	N/A	<40 U	N/A
SULFATE	mg/L		N/A	2370	N/A
Dissolved Gases (RSK-175)					
CARBON DIOXIDE	ug/L		N/A	92300	N/A
ETHANE	ug/L		N/A	<2 U	N/A
ETHENE	ug/L		N/A	<2 U	N/A
METHANE	ug/L		N/A	2.06 J	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter

LHAAP-67
Quarterly MNA Sampling (May 2014) / Remedial Action Field Work (June 2014)

Location ID: Sample Date:	Units	MCL/ MSC	67DPT14 16061402 6/16/2014	67WW01- 050714 5/7/2014	67WW02- 050614 5/6/2014	67WW05- 050614 5/6/2014	67WW07- 050614 5/6/2014	67WW08- 050714 5/7/2014	67WW09A- 050614 5/6/2014	67WW10- 050614 5/6/2014	67WW12- 050614 5/6/2014	67WW13- 050614 5/6/2014	67WW13FD- 050614 5/6/2014	67WW14- 050714 5/7/2014
ID Location:			Site 67 - Central, just S of 67WW08. Intermediate Zone. Sampled Once	Site 67 - SW, within site boundary. Sampled quarterly	Site 67 - NW, within site boundary. Sampled quarterly	Site 67 - WNW, outside site boundary. Sampled quarterly	Site 67 - E, outside site boundary. Sampled quarterly	Site 67 - SSE, within the site boundary. Sampled quarterly	Site 67 - S, outside site boundary. Sampled quarterly	Site 67 - SE, outside site boundary. Sampled quarterly	Site 67 - NNE, outside site boundary. Sampled quarterly	Site 67 - WSW, within site boundary. Sampled quarterly	Site 67 - WSW, within site boundary. Sampled quarterly	Site 67 - SW, outside site boundary beside Ignatius Avenue. Sampled quarterly
Sulfide (376.1)														
SULFIDE	mg/L	N/A	N/A	<1 U	N/A	N/A	N/A	<1 U	N/A	N/A	N/A	N/A	N/A	N/A
Total Carbon (415.1)														
TOTAL INORGANIC CARBON (TIC)	mg/L	N/A	N/A	23.4	N/A	N/A	N/A	80.6	N/A	N/A	N/A	N/A	N/A	N/A
TOTAL ORGANIC CARBON (TOC)	mg/L	N/A	N/A	5.25	N/A	N/A	N/A	10.6	N/A	N/A	N/A	N/A	N/A	N/A
Volatile Organic Compounds (8260B)														
1,1,1,2-TETRACHLOROETHANE	ug/L	110	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L	14	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.4 U	<0.4 U	<0.4 U	<0.8 U	<0.8 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	5.01 J	<0.5 U	<0.5 U	<0.5 U	1.99 J	1.95 J	<0.5 U
1,1-DICHLOROETHANE	ug/L	10000	<0.25 UJ	11	0.44 J	<0.25 U	<0.25 U	57.3	<0.25 U	<0.25 U	<0.25 U	15.5	14.4	0.538 J
1,1-DICHLOROETHENE	ug/L	7	<1 UJ	257	<1 U	<1 U	<1 U	1590	<1 U	<1 U	<1 U	240	228	4.27
1,1-DICHLOROPROPENE	ug/L	2.9	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L	310	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<3 U	<0.3 U	<0.3 U	<0.3 U	<0.6 U	<0.6 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L	0.004	<1 UJ	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.4 U	<0.4 U	<0.4 U	<0.8 U	<0.8 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 UJ	<2 U	<2 U	<2 U	<2 U	<20 U	<2 U	<2 U	<2 U	<4 U	<4 U	<2 U
1,2-DIBROMOETHANE	ug/L	0.005	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L	600	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	12.2	<0.5 U	<0.5 U	1.44	101	<0.5 U	<0.5 U	<0.5 U	13.7	12.9	0.897 J
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.4 U	<0.4 U	<0.4 U	<0.8 U	<0.8 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L	5100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L	3100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L	29	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.4 U	<0.4 U	<0.4 U	<0.8 U	<0.8 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L	42	<0.5 U	<0.5 U	<0.5 UJ	<0.5 UJ	<0.5 UJ	<5 U	<0.5 UJ	<0.5 UJ	<0.5 U	<1 UJ	<1 UJ	<0.5 U
2-BUTANONE	ug/L	61000	<5 U	<5 U	<5 U	<5 U	<5 U	<50 U	<5 U	<5 U	<5 U	<10 U	<10 U	<5 U
2-CHLOROTOLUENE	ug/L	2000	<0.25 UJ	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
2-HEXANONE	ug/L	6100	<5 UJ	<5 U	<5 U	<5 U	<5 U	<50 U	<5 U	<5 U	<5 U	<10 U	<10 U	<5 U
4-CHLOROTOLUENE	ug/L	2000	<0.5 UJ	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L	8200	<5 U	<5 U	<5 U	<5 U	<5 U	<50 U	<5 U	<5 U	<5 U	<10 U	<10 U	<5 U
ACETONE	ug/L	92000	<5 U	<5 U	<5 U	<5 U	<5 U	<50 U	<5 U	<5 U	<5 U	<10 U	<10 U	<5 U
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	1.21 J	0.79 J	<0.25 U
BROMOBENZENE	ug/L	2000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
BROMOCHLOROMETHANE	ug/L	4100	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.4 U	<0.4 U	<0.4 U	<0.8 U	<0.8 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	4.6	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
BROMOFORM	ug/L	36	<1 U	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
BROMOMETHANE	ug/L	140	<1 U	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
CARBON DISULFIDE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
CHLOROETHANE	ug/L	41000	<1 U	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
CHLOROFORM	ug/L	1000	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	4.88 J	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
CHLOROMETHANE	ug/L	220	<1 U	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	1.29	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	0.755 J	0.684 J	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L	5.3	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	34	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
DIBROMOMETHANE	ug/L	380	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L	20000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U

LHAAP-67
Quarterly MNA Sampling (May 2014) / Remedial Action Field Work (June 2014)

Location ID: Sample Date:	Units	MCL/ MSC	67DPT14 16061402 6/16/2014	67WW01- 050714 5/7/2014	67WW02- 050614 5/6/2014	67WW05- 050614 5/6/2014	67WW07- 050614 5/6/2014	67WW08- 050714 5/7/2014	67WW09A- 050614 5/6/2014	67WW10- 050614 5/6/2014	67WW12- 050614 5/6/2014	67WW13- 050614 5/6/2014	67WW13FD- 050614 5/6/2014	67WW14- 050714 5/7/2014
ID Location:			Site 67 - Central, just S of 67WW08. Intermediate Zone. Sampled Once	Site 67 - SW, within site boundary. Sampled quarterly	Site 67 - NW, within site boundary. Sampled quarterly	Site 67 - WNW, outside site boundary. Sampled quarterly	Site 67 - E, outside site boundary. Sampled quarterly	Site 67 - SSE, within the site boundary. Sampled quarterly	Site 67 - S, outside site boundary. Sampled quarterly	Site 67 - SE, outside site boundary. Sampled quarterly	Site 67 - NNE, outside site boundary. Sampled quarterly	Site 67 - WSW, within site boundary. Sampled quarterly	Site 67 - WSW, within site boundary. Sampled quarterly	Site 67 - SW, outside site boundary beside Ignatius Avenue. Sampled quarterly
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L	20	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
ISOPROPYLBENZENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
M,P-XYLENE	ug/L	10000	<1 U	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
NAPHTHALENE	ug/L	2000	<0.4 UJ	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.4 U	<0.4 U	<0.4 U	<0.8 U	<0.8 U	<0.4 U
N-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
N-PROPYLBENZENE	ug/L	4100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
O-XYLENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L	10000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
SEC-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.25 U	<0.25 U	<0.25 U	<0.5 U	<0.5 U	<0.25 U
TERT-BUTYLBENZENE	ug/L	4100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L	29	<1 U	<1 U	<1 U	<1 U	<1 U	<10 U	<1 U	<1 U	<1 U	<2 U	<2 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	3	<0.5 U	<0.5 U	<0.5 U	4.41 J	<0.5 U	<0.5 U	<0.5 U	1.25 J	1.27 J	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L	31000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	<1 U	<1 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	2.15	<0.5 U	<0.5 U	<0.5 U	<5 U	<0.5 U	<0.5 U	<0.5 U	0.644 J	0.619 J	<0.5 U
Inorganic Anions (9056)														
CHLORIDE	mg/L	N/A	N/A	981	N/A	697	N/A	1380	N/A	N/A	N/A	N/A	N/A	N/A
NITRATE	mg/L	10	N/A	<1 U	N/A	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A
NITRITE	mg/L	1	N/A	<1 U	N/A	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A
SULFATE	mg/L	N/A	N/A	167	N/A	N/A	N/A	365	N/A	N/A	N/A	N/A	N/A	N/A
Dissolved Gases (RSK-175)														
ETHANE	ug/L	N/A	N/A	<2 U	N/A	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A
ETHENE	ug/L	N/A	N/A	<2 U	N/A	N/A	N/A	<2 U	N/A	N/A	N/A	N/A	N/A	N/A
METHANE	ug/L	N/A	N/A	33.5	N/A	N/A	N/A	6.97	N/A	N/A	N/A	N/A	N/A	N/A
Ferrous Iron (SM3500FE)														
FERROUS IRON	mg/L	N/A	N/A	5.69	N/A	N/A	N/A	0.282	N/A	N/A	N/A	N/A	N/A	N/A

Blue Highlighting Indicates concentrations above the MCL/MSC

Note: Some samples may have been diluted due to the concentration(s) of one or more analytes exceeding the upper limit of the calibration curve.

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

MCL/MSC - Maximum Contaminant Limit/Medium-Specific Concentrations

mg/L - milligrams per liter

N/A - not analyzed

U - Undetected: The analyte was analyzed for, but not detected.

UJ - The analyte was not detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria.

ug/L - micrograms per liter