LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

ADMINISTRATIVE RECORD

Volume 2 of 8

2013

Bate Stamp Numbers
00119040 - 00119379

Prepared for
Department of the Army
Longhorn Army Ammunition Plant

1976 – 2013

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

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2013

A. Title: Meeting Minutes - Longhorn Army Ammunition Plant Restoration Advisory Board (RAB) Meeting
Author(s): AECOM Technical Services
Recipient: All Stakeholders
Date: April 4, 2013
Bate Stamp: 00119040 - 00119074

B. Title: Meeting Minutes - Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
Author(s): AECOM Technical Services
Recipient: All Stakeholders
Date: April 4, 2013
Bate Stamp: 00119075 – 00119085

C. Title: Memorandum for Record - Notification of Remedial Action Well Construction Completion, LHAAP-46, Plant 2 Area, Longhorn Army Ammunition Plant, Karnack, TX
Author(s): AECOM Technical Services
Recipient: U.S. Army Corps of Engineers
Date: April 30, 2013
Bate Stamp: 00119086

D. Title: Memorandum for Record - Notification of Remedial Action Well Construction Completion, LHAAP-67, Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant, Karnack, TX
Author(s): AECOM Technical Services
Recipient: U.S. Army Corps of Engineers
Date: April 30, 2013
Bate Stamp: 00119087

E. Title: Report - Final Proposed Plan for LHAAP-03, Former Waste Collection Pad Building 722-P Paint Shop, Longhorn Army Ammunition Plant, Karnack, Texas
Author(s): AECOM Technical Services
Recipient: U.S. Army Corps of Engineers
Date: May 24, 2013
Bate Stamp: 00119088 - 00119102

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2013

F. Title: Meeting Minutes - Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
Author(s): AECOM Technical Services
Recipient: All Stakeholders
Date: May 30, 2013
Bate Stamp: 00119103 - 00119141

G. Title: Meeting Notice and Transcript - Longhorn Army Ammunition Plant Proposed Plan Public Meeting for LHAAP-03
Author(s): AECOM Technical Services
Recipient: All Stakeholders
Date: May 30, 2013
Bate Stamp: 00119142 - 00119192

H. Title: Meeting Minutes - Longhorn Army Ammunition Plant Monthly Managers' Meeting Minutes
Author(s): AECOM Technical Services
Recipient: All Stakeholders
Date: June 20, 2013
Bate Stamp: 00119193 - 00119204

I. Title: Report - Final Remedial Action Work Plan for LHAAP-50, Former Sump Water Tank, Longhorn Army Ammuntion Plant, Karnack, Texas
Author(s): AECOM Technical Services
Recipient: U.S. Army Corps of Engineers
Date: June 28, 2013
Bate Stamp: 00119205 - 00119259

J. Title: Report - Final Remedial Action Work Plan for LHAAP-35B(37), Chemical Laboratory, Longhorn Army Ammuntion Plant, Karnack, Texas
Author(s): AECOM Technical Services
Recipient: U.S. Army Corps of Engineers
Date: June 28, 2013
Bate Stamp: 00119260 - 00119379

AECOM

Subject:	**Final Minutes, Quarterly Restoration Advisory Board (RAB) Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Karnack Community Center, Karnack, Texas**
Date of Meeting:	**April 4, 2013, 4:30 – 6:00 PM**

Meeting Participants:

LHAAP/BRAC:	Rose M. Zeiler
USACE:	Aaron Williams, Wendy Lanier
AECOM:	Dave Wacker, Gretchen McDonnell
TCEQ:	April Palmie
USEPA Region 6:	Rich Mayer, Janetta Coats, Kent Becher (USGS)
USFWS:	Jason Roesner
RAB:	**Present:** Paul Fortune, Pickens Winters, Judy Van Deventer, Judith Johnson, Robert Cargill, Lee Guice, Richard LeTourneau, Tom Walker, **Absent:** Ken Burkhalter, Ted Kurz, Jim Lambright, Charles Dixon, Carol Fortune, Nigel Shivers
Public:	Terry Britt, Bill Mauthe, Two additional unidentified (illegible roster signatures)

An agenda for the RAB meeting was distributed prior to the meeting.

Welcome – Rose Zeiler
Ms. Zeiler welcomed attendees to the meeting. Mr. Wacker advised attendees that there were handouts providing information on various sites at the entry tables.

Open Items – Rose Zeiler
RAB Tour
The RAB tour of LHAAP sites was conducted today from 2PM to 4PM. Mr. Dave Wacker, AECOM led the tour and provided information at each of the various sites, including the ground water treatment plant, 18/24, 04, 12, 16, 17, 29 and several others. A review of the tour will be presented at the next RAB meeting.

Attending the tour were:

Rose Zeiler	Longhorn AAP
Paul Fortune, Judith Johnson, Judy Van Deventer, Pickens Winters, Richard LeTourneau, Terry Britt (prospective member)	RAB Members
April Palmie	TCEQ
Rich Mayer, Janetta Coats	USEPA
Wendy Lanier, Aaron Williams	USACE
Dave Wacker, Gretchen McDonnell	AECOM
Jason Roesner	USFWS
Dawn Orsak	Caddo Lake Institute – USEPA TAG

RAB Administrative Issues

New Member Solicitation – Membership applications will be provided to Terry Britt and Bill Mauthe. An application form for Glenn Burkel will be sent to Paul Fortune.

Minutes

Ms. Johnson made a motion to approve all the January 2013 RAB meeting minutes. Motion seconded by Paul Fortune.

Website

Army is working with AECOM to develop a website where RAB members can access key documents. This will be discussed further in coming weeks. RAB members will likely receive notification of availability of the website within the next few weeks.

Defense Environmental Restoration Program (DERP) Update – AECOM (Dave Wacker)

Document Status/Environmental Sites

Ms. McDonnell provided descriptions of field activities shown in a display of photos from recent field work at LHAAP-18/24, LHAAP-46 and LHAAP-67.

Ms. Johnson asked about the comparative cost and speed of groundwater pump and treat and potential other technologies that have been developed over recent years. Ms. Zeiler stated that the final remedies for sites currently served by the GWTP may well include other technologies that can clean up the site more quickly and more cost effectively.

CERCLA 5-Year Review Process Video. Mr. Mayer introduced and presented an USEPA video created to help the public understand the 5-year review process at Superfund sites. Ms. Zeiler stated that the Army retains the responsibility for conducting the future 5-year reviews regardless of whether the land is transferred. Mr. Mayer stated that USEPA conducts the 5-year reviews at private, non-Federal sites. Ms. Zeiler stated that the most recent 5-year review report is in the administrative record, and the next review report will be coming out later this year.

Mr. Winters asked if Longhorn cleanup operations will be impacted by sequestration. Ms. Zeiler stated that there is no impact expected on the environmental cleanup due to sequestration. However, it will impact the days that meetings are held since Federal staff will be on mandatory furlough on Fridays through the end of the fiscal year.

Status reviews were presented for sites with significant activities upcoming in the near-term. (See attached AECOM Powerpoint presentation.)

LHAAP-03 Proposed Plan._ The Proposed Plan public meeting date is tentatively June 11th, but may be rescheduled for May. This is a very small site, 30' x 20' which will likely be excavated. Thet Proposed Plan document will be coming to the RAB shortly.

Introduction to In-Situ Bioremediation. (See attached "Introduction to ISB" Powerpoint presentation.) ISB is one of the newer ways to remediate contamination. Mr. Winters asked if microbes and substrate could be injected at the same time. Mr. Wacker said they can be injected relatively close in time together, but would not be done during the same injection. The presentation covered topics such as bioaugmentation and contaminant breakdown products, and showed photos of ISB operations at other facilities. ISB will be used at LHAAP-04, LHAAP-47 and LHAAP-58, and may be used at LHAAP-18/24. AECOM will present some case studies showing remediation success with ISB at a future RAB meeting.

Groundwater Treatment Plant (GWTP) Update

The GWTP continues to operate to maintain containment of the plume at LHAAP-18/24. Treated water was has been released to Harrison Bayou for the last few months, since sufficient water flow has been present in the bayou. A handout showing surface water sample results was also provided and reviewed. (See attached Surface Water Sampling Results handout.) Ms. Zeiler stated that this information can be shared with the public by the RAB members to show that contaminants have not been released to Caddo Lake for quite some time. Ms. Palmie noted that Goose Prairie Creek was dry in January, so AECOM went back and sampled in February when water was first observed in that area. Mr. LeTourneau asked if treated water is discharged from the GWTP to Harrison Bayou on a continual basis during the rainy season. Ms. Zeiler responded that there is discharge to Harrison Bayou during the rainy season but that it is done based on flow in the Bayou to ensure discharge limits are not exceeded. Ms. Zeiler also referenced the surface water sampling handout to show that there has been no contaminant exceedance in the Bayou for quite some time.

Decision Document Sites Review

Mr. Williams provided a review of four non-residential use sites (LHAAP-19, LHAAP-56, LHAAP-65 and LHAAP-69) for which Decision Documents are being developed. (See attached AECOM presentation.) All four sites were determined to be suitable for non-residential use. No further action is required for these four sites. The sites will be evaluated every five years to confirm the use remains non-residential. Ms. Palmie clarified that TCEQ will be looking at these sites to ensure protectiveness every five years as part of the 5-year review process. Ms. Zeiler noted that the purpose of the Decision Document is to document for the record the decisions made, and agency concurrence with decisions made, for management of these sites.

Mr. Fortune asked about a historical allegation of mercury disposal at LHAAP-19. The allegation was that mercury switches were disposed of illegally at LHAAP-19. Ms. Zeiler stated that Army and USEPA both investigated the allegations and determined there was no validity and no basis.

Mr. Mauthe asked if Tulsa District USACE is run by Fort Worth District USACE. Ms. Zeiler and Ms. Lanier explained that Fort Worth District did manage the project historically, but Tulsa District has been managing for quite some time due to specialized expertise with CERCLA sites held by the personnel in the Tulsa District.

Upcoming Field Work
Field work for LHAAP-18/24, LHAAP-46 and LHAP-67 should be complete by the end of April. Routine compliance sampling will start in late April or early May, and will take a few weeks to complete. This summer, field work will be conducted at LHAAP-37, LHAAP-50 and LHAAP-58, similar in nature to that currently being done at LHAAP-46 and LHAAP-67.

Other DERP Environmental Restoration Update – Rose Zeiler
LHAAP-37 Bioplug Demonstration Project
Ms. Zeiler advised that a presentation on the initial results for the project is anticipated for the RAB meeting to be held in September/October.

Sitewide Land Use Controls (LUC) Management Plan Update
Ms. Zeiler stated that the update of this plan for the year was recently completed.

Community Involvement Plan (CIP) – The document has been provided to the RAB for review and comment. All comments should be submitted by or before the next RAB meeting.

Military Munitions Response Program (MMRP) – USACE
No update at this time.

Other Environmental Restoration Issues – Rose Zeiler
Dispute Resolution
Dispute resolution continues. Nothing specific to update since last RAB meeting.

Look Ahead at the Schedule
Next RAB meeting is scheduled for July 16th from 4PM – 6PM at the Karnack Community Center.

The LHAAP-03 Proposed Plan public meeting is anticipated for June 11th, but RAB members should watch their email for this to change to an earlier date.

A motion to adjourn was made by Mr. Cargill and seconded by Ms. Zeiler.

Adjourn

April Meeting Attachments and Handouts:
- *Meeting Agenda*
- *Minutes from January meeting*
- *AECOM Powerpoint Presentation*
- *Surface Water Sampling Results Handout*
- *GWTP Treated Groundwater Volumes Handout*

Acronyms

AECOM	AECOM Technical Services, Inc.
BRAC	Base Realignment and Closure
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
CLI	Caddo Lake Institute
DERP	Defense Environment Response Program
GWTP	Groundwater Treatment Plant
ISB	In-Situ Bioremediation
LHAAP	Longhorn Army Ammunition Plant
LUC	Land Use Controls
MMRP	Military Munitions Response Program
RAB	Restoration Advisory Board
TAG	Technical Assistance Grant
TCEQ	Texas Commission on Environmental Quality
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

LONGHORN ARMY AMMUNITION PLANT
RESTORATION ADVISORY BOARD
Karnack, Texas
(479) 635-0110

AGENDA

DATE:	Thursday, April 4, 2013
TIME:	2:00 – 6:00 PM
PLACE:	Karnack Community Center, Karnack, Texas

2:00 Begin Bus Tour of LHAAP Environmental Sites

4:00 End Bus Tour of LHAAP Environmental Sites

04:30 Welcome and Introduction

04:35 Open items {RMZ}
- RAB Administrative Issues
- New Members
- Minutes
- Website
- RAB Tour

05:00 Defense Environmental Restoration Program (DERP) Update {AECOM}
- Questions from tour of sites
- Groundwater Treatment Plant (GWTP) Update
- Introduction to in-situ bioremediation
- Fieldwork completed since last meeting

05:20 CERCLA 5 Year Review Process Video{RM}

05:30 Other DERP Environmental Restoration Update {RMZ}
- Decision Documents for multiple sites
- Status of Demonstration at Site 37
- Sitewide LUC Management Plan Update

05:35 Military Munitions Response Program (MMRP) {USACE}

05:45 Other Environmental Restoration Issues {RMZ}
- CRP/CIP status
- Dispute Resolution

LONGHORN ARMY AMMUNITION PLANT
RESTORATION ADVISORY BOARD
Karnack, Texas
(479) 635-0110

05:50 Look Ahead at the Schedule

06:00 Adjourn {RMZ}

AECOM

Subject:	**Draft Minutes, Quarterly Restoration Advisory Board (RAB) Meeting, Longhorn Army Ammunition Plant (LHAAP)**
Location of Meeting:	**Karnack Community Center, Karnack, Texas**
Date of Meeting:	**January 8, 2013, 6:00 – 08:00 PM**

<u>Meeting Participants:</u>

LHAAP/BRAC:	Rose M. Zeiler
USACE:	Aaron Williams, Wendy Lanier
USAEC:	Marilyn Plitnik
AECOM:	Dave Wacker, Gretchen McDonnell, Michael Ishee (World Environmental), Debra Ishee (World Environmental)
TCEQ:	Fay Duke, April Palmie
USEPA Region 6:	Rich Mayer, Paul Torcoletti, Janetta Coats
USFWS:	Jason Roesner
RAB:	**Present:** Paul Fortune, Robert Cargill, Charles Dixon, Carol Fortune, Judith Johnson, Richard LeTourneau, Nigel Shivers, Tom Walker, Pickens Winters **Absent:** Ken Burkhalter, Lee Guice, Ted Kurz, Jim Lambright, E.V. Wilson, Judy Van Deventer
Public:	Dawn Orsack and George Rice (CLI - TAG), Glenn Evans (Longview News)

An agenda for the RAB meeting was distributed prior to the meeting. Paul Fortune called the meeting to order.

Welcome – Rose Zeiler
Ms. Zeiler welcomed attendees to the meeting. First time RAB meeting attendees introduced themselves:

- Michael and Debra Ishee of World Environmental, an AECOM contractor.
- April Palmie, TCEQ, assisting Fay Duke. Ms. Duke is anticipating retirement and Ms. Palmie is transitioning into the project to fill the TCEQ representative role.

Open Items – Rose Zeiler

RAB Administrative Issues

RAB Meeting Attendence and Member Solicitation - Ms. Zeiler stated a RAB meeting attendance roster was sent to the RAB members at their request to facilitate a review of member attendance. There was discussion at the last meeting about appointing new members. Mr. Fortune stated E.V. Wilson has submitted his written resignation.

Mr. Glenn Burkel has expressed interest in being appointed to the RAB. The RAB will undertake appointing Mr. Burkel at the next RAB meeting.

RAB membership solicitation is required every two years. Army will place an announcement in the newspaper asking interested parties to attend the next RAB meeting and see what responses are received. Mr. Fortune requested a template RAB application form. The form will be sent electronically to Mr. Fortune.

LHAAP Staff Organizational Chart - Judith Johnson requested that AECOM provide a simple organizational chart of the project staff and representatives that attend RAB meetings. Dave Wacker then showed an organizational chart showing key staff and reviewed those positions. Ms. Johnson requested a copy of that chart. Mr. Wacker stated he would add some additional staff to the chart and provide that as a handout at the next RAB meeting.

Minutes

Ms. Johnson made a motion to approve all the October 2012 RAB meeting minutes. Motion seconded by Robert Cargill.

Community Involvement Plan (CIP) Update Status

Ms. Zeiler stated that Army and agency comments are being incorporated into a revised CIP that will be submitted for RAB review. Ms. Zeiler said she felt the interview responses indicated that there is a lack of information getting to the public, and asked for the RAB's assistance in identifying gaps in information that they want/need.

Mr. Fortune said that he feels the RAB just needs to get to know AECOM and get a feel for whether AECOM will provide adequate explanations on the topics of interest. Mr. Fortune and Army will accept emails requesting additional information (fact sheet, short presentation, etc.) on any particular subject. The information requests will be reviewed to consider integration of those topics into future RAB meeting presentations.

Site Status Updates

Charles Dixon asked for a status update on the bioplug demonstration at LHAAP-37. Ms. Zeiler advised that a presentation is being planned for the April RAB meeting. Mr. Dixon said that the presentation should include whatever it takes to show them whether it is working.

Mr. Cargill suggested Army prepare a brief summary (perhaps a map overview) of where all contamination sites were, which have been closed and which sites are still open (indicating whether groundwater or soil impacts). Marilyn Plitnik informed the group that a draft of the revised CIP is being prepared now that all required data has been collected and interviews conducted. RAB members will each receive a copy of the new CIP.

Website
The timetable for having the website up and running was unknown but it is being worked on. Ms. Zeiler stated she would check with USACE on the status as Ms. Plitnik stated the process has now passed to USACE.

RAB Tour
Schedule for the upcoming RAB tour of the facility was discussed. Majority vote supported the tour taking place on April 4th from 2-4 PM.

RAB Meeting Schedule
The RAB voted to move meetings back to Thursday evenings. It was noted that school board meetings are held on the second Thursday of the month and would present a conflict for some members.

Defense Environmental Restoration Program (DERP) Update – AECOM (Dave Wacker)

Document Status/Environmental Sites
Status reviews were presented for sites with significant activities upcoming in the near-term. (See attached Powerpoint presentation.)

LHAAP-46 Plant Area 2. This is a groundwater solvent contamination site. The Remedial Design is complete with the selected remedial alternative being monitored natural attenuation. Monitoring wells will be installed with data collected quarterly for two years to determine whether contaminant levels are decreasing. Monitored natural attenuation (MNA) is considered a "passive" remedial technique, letting natural processes do the remediation. EPA guidance will be followed in making the determination as to whether the natural attenuation is working. This approach is suitable for sites where the contaminant concentrations are closer to the end goal. A Remedial Action Work Plan has been developed to facilitate remedial action construction. Army is working to get a subcontractor in place to do the associated field work in February. Ms. Zeiler requested AECOM prepare a cross-section of the site to show locations of contamination.

LHAAP-67 AST Farm. This groundwater solvent contamination site is similar to LHAAP-46 in that the selected alternative is MNA. A small 100-foot by 180-foot area must be evaluated over the next two years to confirm successful natural attenuation of contaminants. EPA guidance will be followed in making the determination as to whether the natural attenuation is working. The Remedial Design is complete and Army has developed a Remedial Action Work Plan to facilitate remedial action construction. AECOM is working to get a subcontractor in place to do the associated field work in February.

LHAAP-18/24 Burning Grounds 3/Unlined Evaporation Pond. Army has nearly completed the Post-Screening Investigation (PSI) work plan to collect information to fill data gaps. A Proposed Plan (PP) for this site is expected to be submitted for public comment by early Summer.

LHAAP-03 Paint Shop Waste Collection Pad. LHAAP-03 is a very small site with small area of shallow soil impacted with arsenic, so it's likely that the best remedy for this site is to just remove the impacted soil. Army is awaiting feedback on a Feasibility Study (FS) that has been submitted to the agencies, and that document will ultimately lead to a Proposed Plan being issued for public comment.

Carol Fortune asked if the contamination at this site was really that much of a hazard. Ms. Zeiler stated that Army has to meet the regulatory standards. At Site 3, Army and regulators do not agree on the source of the arsenic – Army believes it might be naturally occurring, but regulators believe it might not be. Mr. Fortune said that it just seems like there is sometimes overkill in cleaning up things that don't pose much risk. Ms. Duke added that Army is complying with the regulatory clean-up standard because arsenic levels found in soil samples exceeded that standard, and the standards must be applied to and adhered to in all cases.

LHAAP-37, LHAAP-50 and LHAAP-58. The bioplug demonstration project at LHAAP-37 is being done separately from the ROD remedy Army is required to complete and which AECOM has been contracted to implement. Expect to hear more about these sites at the next RAB meeting.

LHAAP-12 and LHAAP-16. The caps at these sites must be inspected and maintained in compliance with the remedy. Inspection was conducted in December, with findings including expected maintenance needs. Wells will be painted and relabeled. Wells at LHAAP-16 have been rehabilitated and are now sending water to the GWTP for treatment.

Compliance Sampling. Completed in December for LHAAP-12 and LHAAP-16. Surface water sampling locations were dry, so not sampled.

CERCLA 5-Year Review Process

Mr. Wacker briefly explained that CERCLA requires that many of the closed sites undergo evaluation every 5-years to confirm the continued protectiveness of the remedies. The sites have been inspected by Army and the regulators. An EPA video explaining the CERCLA 5-Year Review Process will be shown at the next RAB meeting.

Mr. Fortune asked to confirm that the AECOM contract requires there to be a remedy in place at each of the sites by the end of the contract. Mr. Wacker confirmed that the AECOM contract takes all the sites under the contract to the Remedy In Place stage of the CERCLA remediation process.

Proposed Plan Sites

LHAAP-04. Mr. Wacker reviewed a summary of the site and the plan for remediation. See attached presentation. Soil impacts have been addressed. Perchlorate in groundwater is the remaining contaminant to be addressed.

LHAAP-47. Mr. Wacker reviewed a summary of the site and the plan for remediation. See attached presentation. Soil and groundwater remedies will be completed for this site.

George Rice, CLI provided a summary of his major comments on the LHAAP-04 and LHAAP-47 Proposed Plans, as he was not able to attend the scheduled proposed plan public meeting. LHAAP-04, Mr. Rice feels that the plan is overall reasonable and good, although there are some adjustments he would make. For LHAAP-47, Mr. Rice's primary comment is that all three of the remedial alternatives evaluated require up to 100 years to achieve the clean-up goals. Mr. Rice feels that an additional alternative with a duration of substantially less than 100 years is needed for the public to be able to determine whether a 100-year clean-up time is reasonable. Dawn Orsack will submit Mr. Rice's full comments in writing to be formally addressed by Army. Ms. Orsack stated that CLI had already held a meeting where more detail of Mr. Rice's comments was provided to attendees.

AECOM was asked to send a copy of the LHAAP map showing the refuge boundary to the RAB members.

Groundwater Treatment Plant (GWTP) Update
The GWTP continues to operate to maintain containment of the plume at LHAAP-18/24. Due to lack of flow in Harrison Bayou, treated water was being returned to the site through the sprinkler system since September. Recent rains have allowed discharge to the Bayou over the past week. For future RAB meetings, a handout showing amounts of water treated, mass of contaminant removed, etc., will be provided.

Upcoming Field Work
LHAAP-18/24. The PSI work plan will be executed to collect additional field data relating to geology and groundwater.

LHAAP-46 and LHAAP-67. Remedial Action Work Plans will be executed, including monitoring well installation and groundwater sampling.

Compliance sampling to be conducted in February.

Military Munitions Response Program (MMRP) – USACE
No update at this time.

Other DERP Environmental Restoration Update – Rose Zeiler
LHAAP-37 Bioplug Demonstration Project
Ms. Zeiler advised that a presentation on the initial results for the project is anticipated for the April RAB meeting.

Sitewide Land Use Controls (LUC) Management Plan Update
Ms. Zeiler stated that the update of this plan is nearing completion. The update will add those sites with decision documents and RODs into the document.

Other Environmental Restoration Issues – Rose Zeiler
Dispute Resolution
Dispute resolution continues. Nothing specific to update since last RAB meeting.

Look Ahead at the Schedule

The RAB tour of the facility is scheduled for April 4th, from 2PM – 4PM, with the RAB meeting to follow from 4:30PM – 6PM at the Karnack Community Center. AECOM will send the RAB members information on where to meet for the RAB tour on the April 4th.

A motion to adjourn was made by Carol Fortune and seconded by Paul Fortune.

New Action Items

Army

- Prepare a cross-section of LHAAP-46 Plant Area 2 to show locations of contamination
- Send a copy of the LHAAP map showing the refuge boundary to the RAB members
- Place an announcement in the newspaper asking interested parties to attend the next RAB meeting
- Send Mr. Fortune a template RAB application form.
- Prepare a brief summary (perhaps a map overview) of all contamination sites
- Send RAB members a copy of the new CIP
- Check with USACE on the status timetable for having the website up and running

Adjourn

January Meeting Attachments and Handouts:

- *Meeting Agenda*
- *Minutes from October meeting*
- *Powerpoint Presentation*

Acronyms

AECOM	AECOM Technical Services, Inc.
AST	Aboveground Storage Tank
BRAC	Base Realignment and Closure
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
CIP	Community Involvement Plan
CLI	Caddo Lake Institute
DERP	Defense Environmental Response Program
FS	Feasibility Study
GWTP	Groundwater Treatment Plant
LHAAP	Longhorn Army Ammunition Plant
LUC	Land Use Controls
MMRP	Military Munitions Response Program
MNA	Monitored Natural Attenuation
PP	Proposed Plan
PSI	Post-Screening Investigation
RAB	Restoration Advisory Board
ROD	Record of Decision
TAG	Technical Assistance Grant
TCEQ	Texas Commission on Environmental Quality
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Center
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

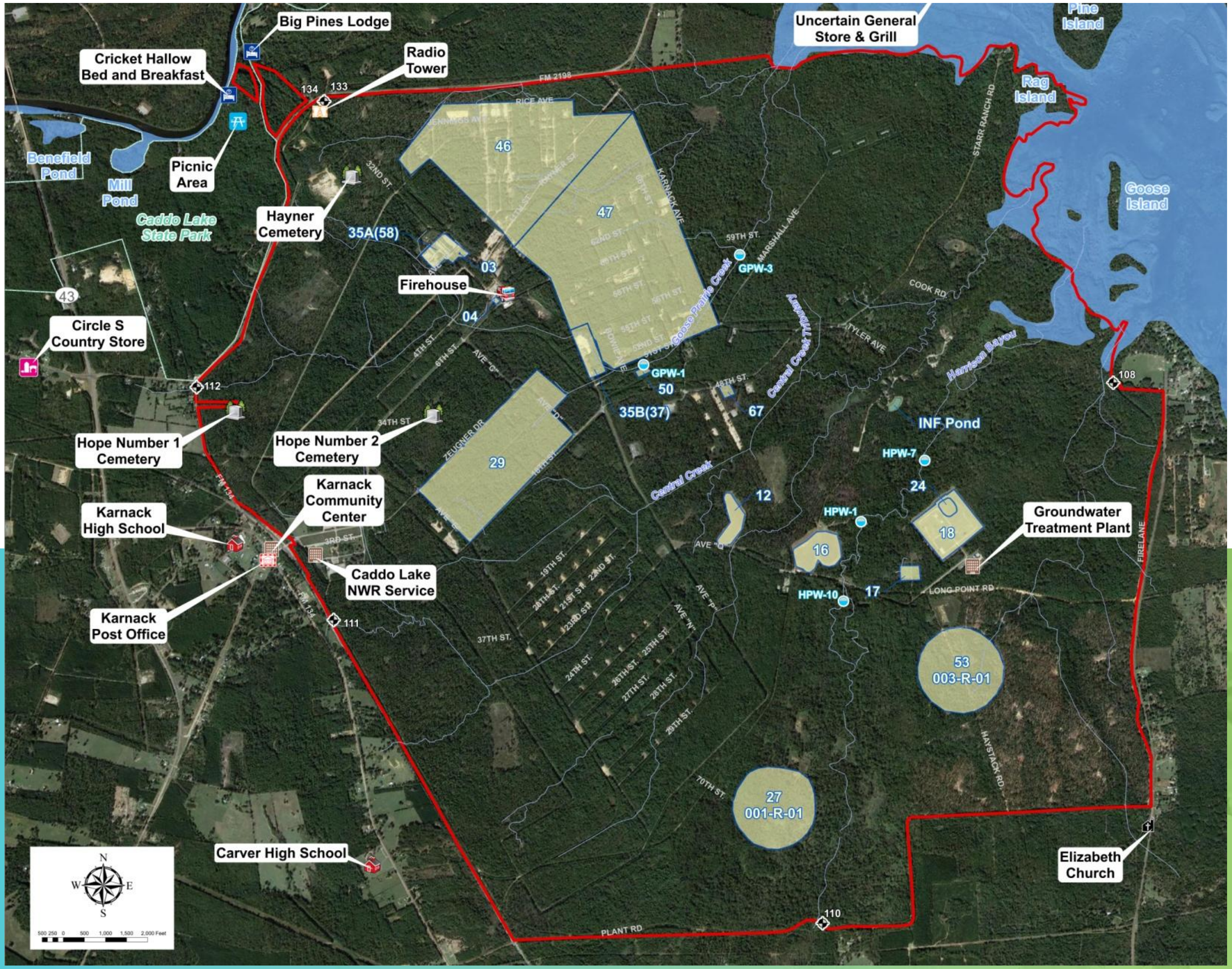
Longhorn Army Ammunition Plant Restoration Advisory Board Meeting April 4, 2013

AECOM Environment

Agenda

1. New Longhorn Map
2. Questions From Tour (status of environmental sites)
3. CERCLA 5 Year Review Process Video
4. Upcoming Proposed Plan for LHAAP-03
5. Introduction to In-situ Bioremediation
6. AECOM Organization Chart for Longhorn
7. Groundwater Treatment Plant (GWTP), Perimeter, and Surface Water Update
8. Decision Documents for LHAAP-19, LHAAP-56, LHAAP-65, and LHAAP-69
9. Site-wide Land Use Control Management Plan Update
10. Status of Demonstration at Site 37
11. Summary of Upcoming Fieldwork and Meetings

New Longhorn Map



AECOM

AECOM Longhorn NPL Sites

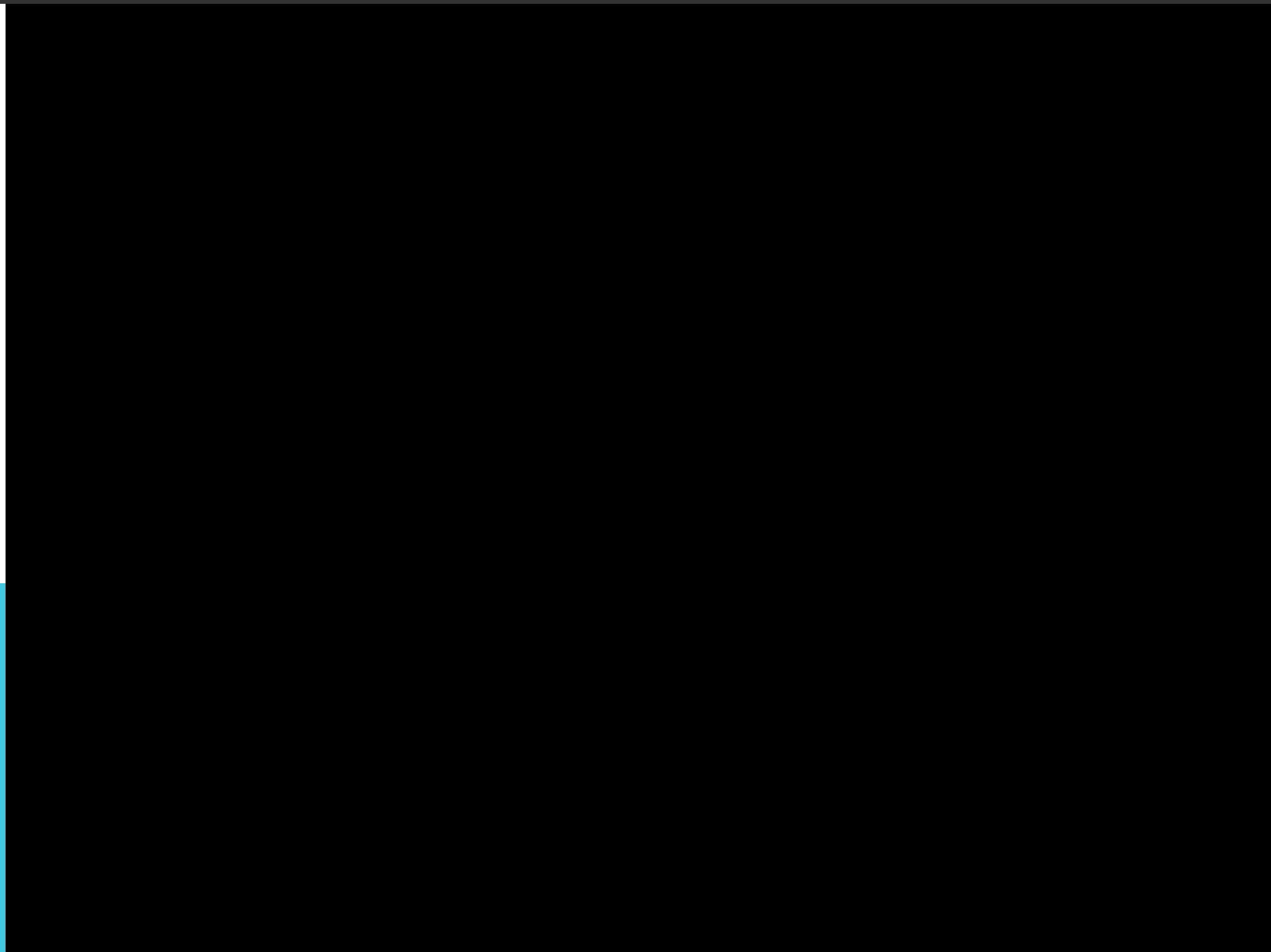
LHAAP-03	Building 722 Paint Shop
LHAAP-04	Pilot Wastewater Treatment Plant
LHAAP-12	Landfill 12
LHAAP-16	Landfill 16
LHAAP-17	Burning Ground No.2/Flashing Area
LHAAP-18	Burning Ground No.3
LHAAP-24	Unlined Evaporation Pond
LHAAP-29	Former TNT Production Area
LHAAP-37	Chemical Laboratory Waste Pad
LHAAP-46	Plant Area 2
LHAAP-47	Plant Area 3
LHAAP-50	Former Sump Water 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

Field Activities Update (as seen on tour)

- March/April
  - Cone penetrometer technology/membrane interface probe Investigation
    - LHAAP-18/24
  - Direct Push Technology
    - LHAAP-46
    - LHAAP-67
  - Installation of Monitoring Wells
    - LHAAP-18/24
    - LHAAP-46
    - LHAAP-67

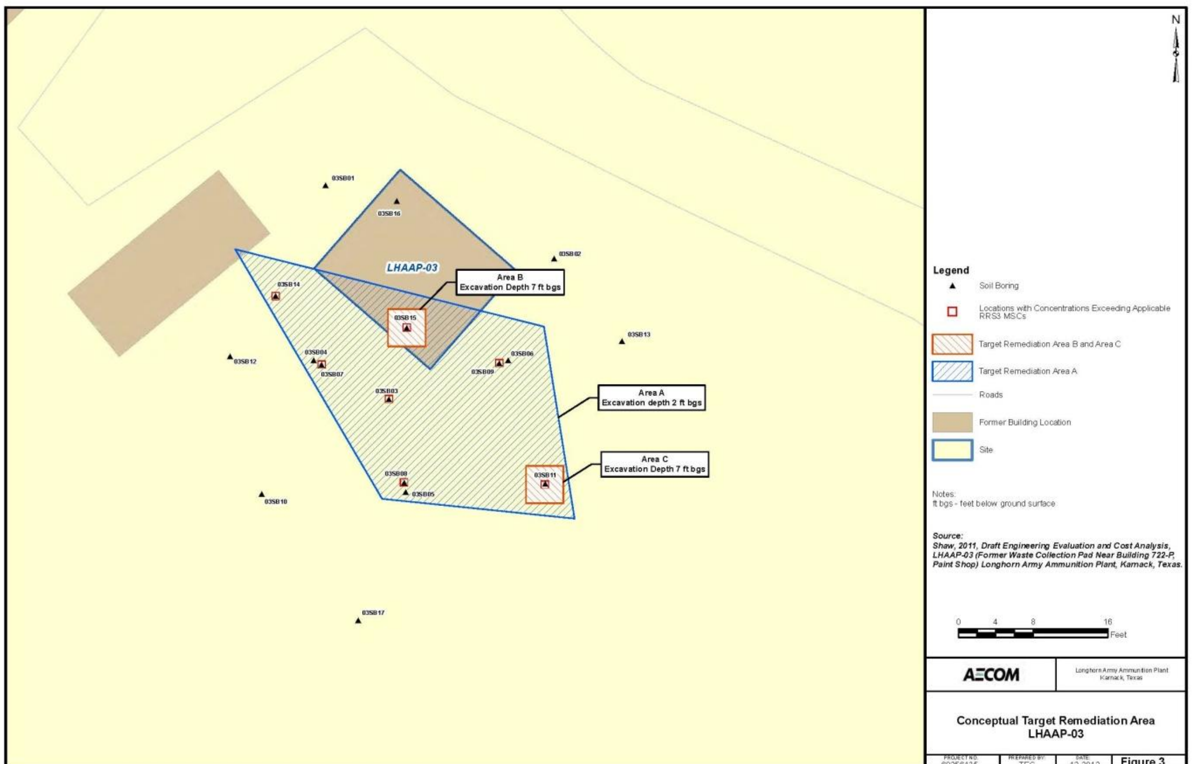
AECOM

CERCLA 5 Year Review Process Video



Proposed Plan Upcoming for LHAAP-03 Paint Shop

- Proposed Plan Public Meeting scheduled for June 11th
- Contains a recommended alternative for excavation of a small soil area contaminated with arsenic and lead and is planned for public comment from June 3rd through July 3rd
- Meeting announcement will be emailed and published in May
- Meeting planned for Karnack Community Center at 6:30pm



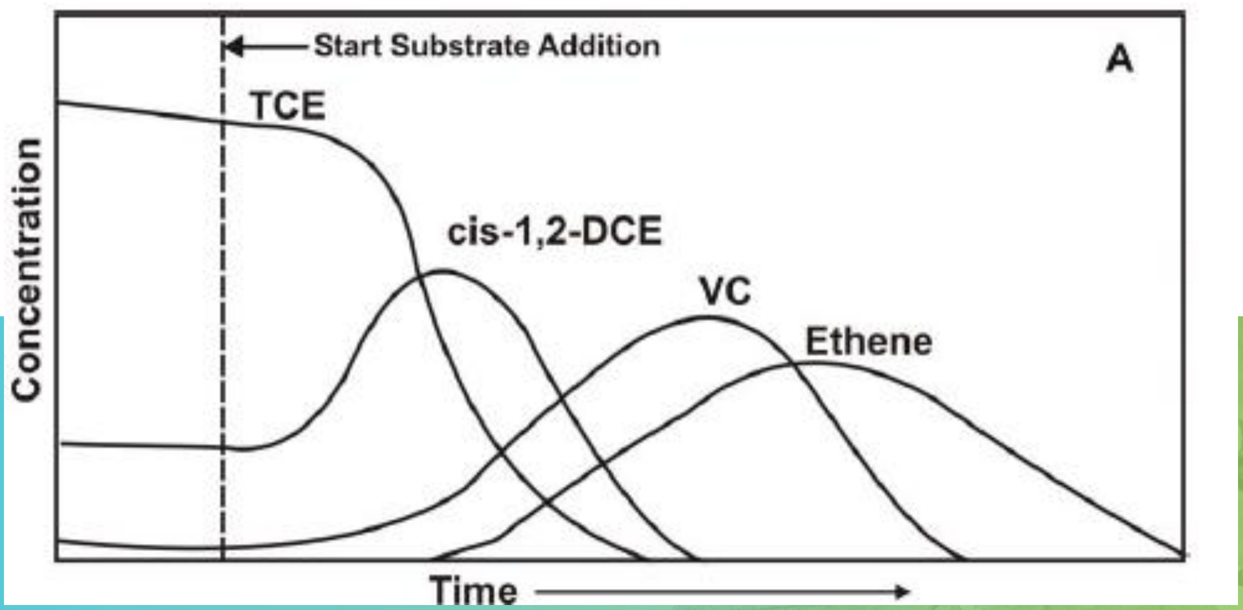
AECOM

Introduction to In-Situ Bioremediation

- In-Situ means “in place” so the treatment will occur without having to move soil or water
- Involves injecting a compound called a “substrate” (usually vegetable oil, molasses, corn syrup, or proprietary blends based upon the contaminant)
- The injected material stimulates naturally occuring bacteria to thrive and in the process breakdown contaminants
- If the bacteria capable of breaking down the contaminant is not present at the site, they can be injected into the same areas as the substrate, this is called “bioaugmentation”

Trichloroethylene and In-situ Bioremediation

- The objective is to reduce concentrations of contaminants over time



AECOM

In-situ Bioremediation Photo's

AECOM

In-situ Bioremediation Photo's

AECOM

AECOM Longhorn Project Organization Chart

Project Manager
Dave Wacker

Deputy Project Manager
Gretchen McDonald

Safety Manager
Dan Schillings

Quality Manager
Rod Croslen

Project Assistant/Document Control
JoLynn Snow

Project Administrator
Katie Crooks

Task/Site Leads

GWTP
Marwan Salameh
Long Term Planning

Don Coulombe
Repairs and Maintenance

03, 16
Harvinder Singh
Harry Van Den Berg

17, 29
Scarlett Zhai
Harry Van Den Berg

50, 58
Eva Moore
Amol Keskar

37, 46, 67
Amol Keskar

04, 47
Amol Keskar

18/24
Marwan Salameh

001-R-01, 003-R-01, 12
Josh Miller

67
Amol Keskar

Subcontractors

GWTP and O&M
World Environmental (SDVSB)
Scott Beesinger
Ray Wagner
Jimmy Davis

Sampling Support
Eagle Environmental (SB)

Drilling
ETTL
Fugro

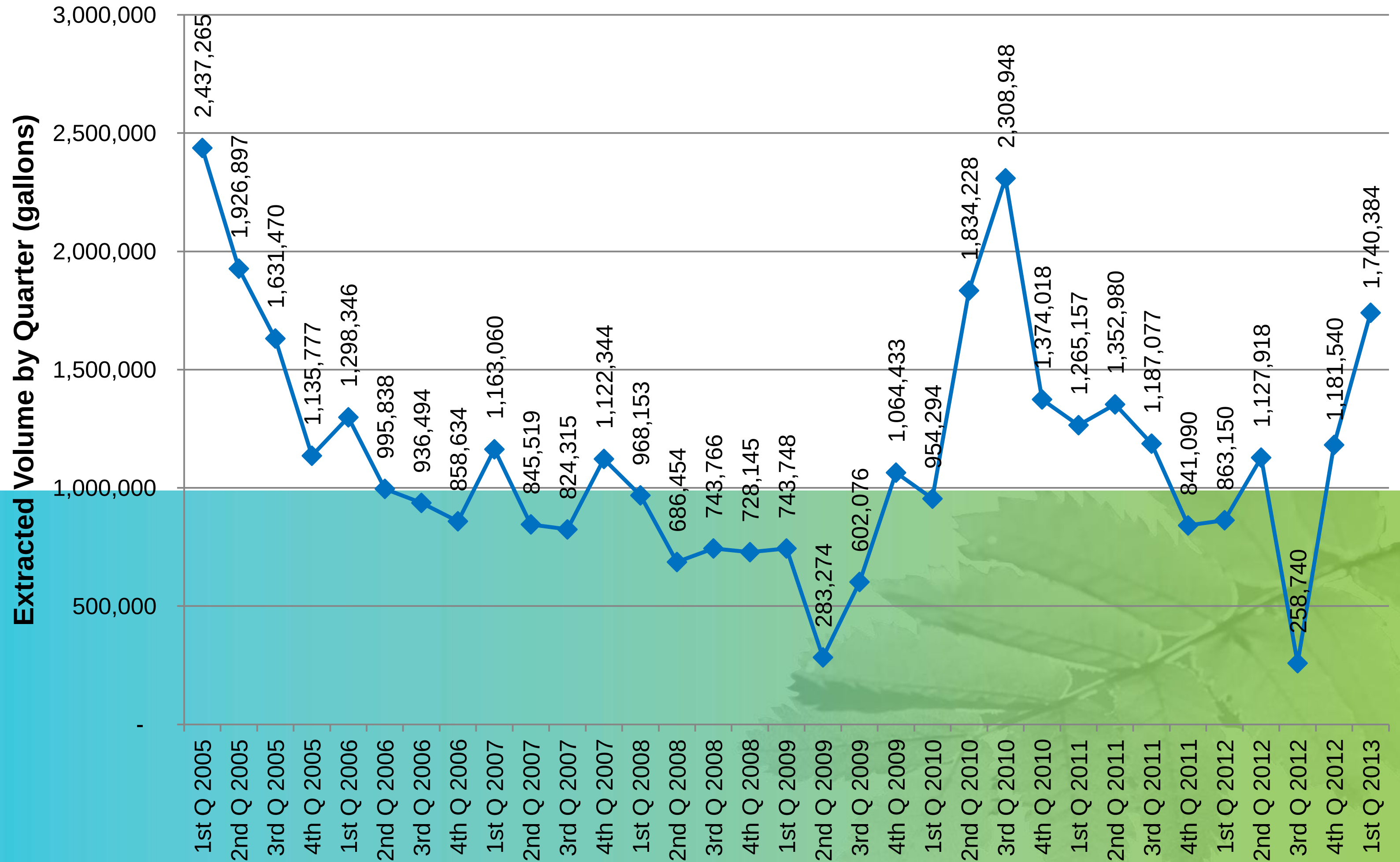
Lab
Micobac

Groundwater Treatment Plant Operations and Management

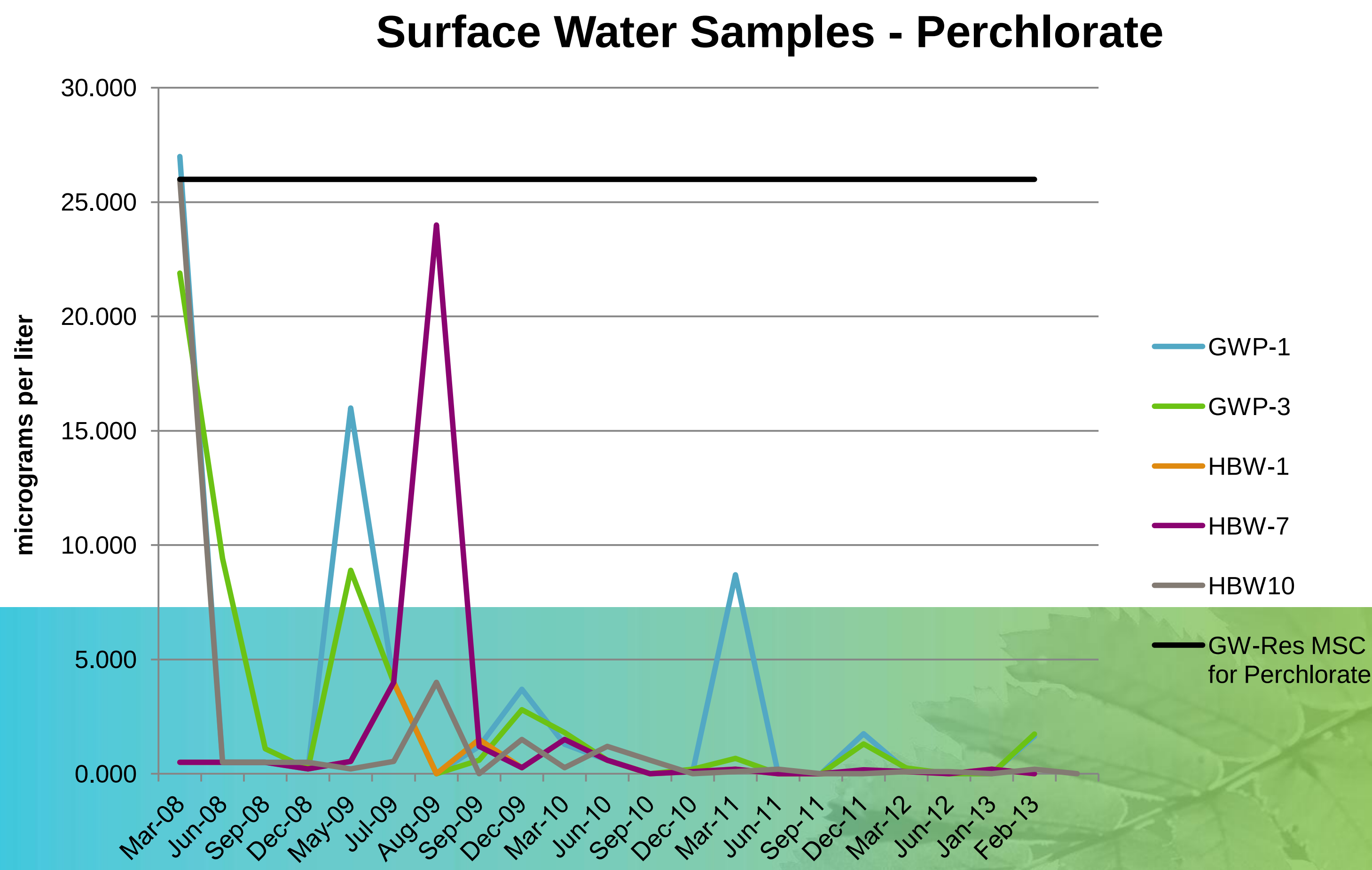
- The Groundwater Treatment Plant continues to operate to contain the plume at LHAAP-18/24 and LHAAP-16
- Water continues to be returned to LHAAP-18/24, a holding pond or into Harrison Bayou depending on the amount of water in the bayou
- Compliance monitoring continues per existing sampling plan

GWTP O&M (cont)

Quarterly Extraction Rate



GWTP O&M (cont)



GPW – Goose Prairie Creek

HBW – Harrison Bayou

AECOM

Sitewide LUC Management Plan Update

- Is a compilation of existing information
- Contains land use requirements and controls for each site
- Includes plats, legal descriptions and county recordations
- Is updated or certified annually

Upcoming Fieldwork, Meetings and Documents

1. Complete LHAAP-18/24, LHAAP-46 and LHAAP-67 well installation and sampling

2. Semi-Annual compliance sampling planned for April/May

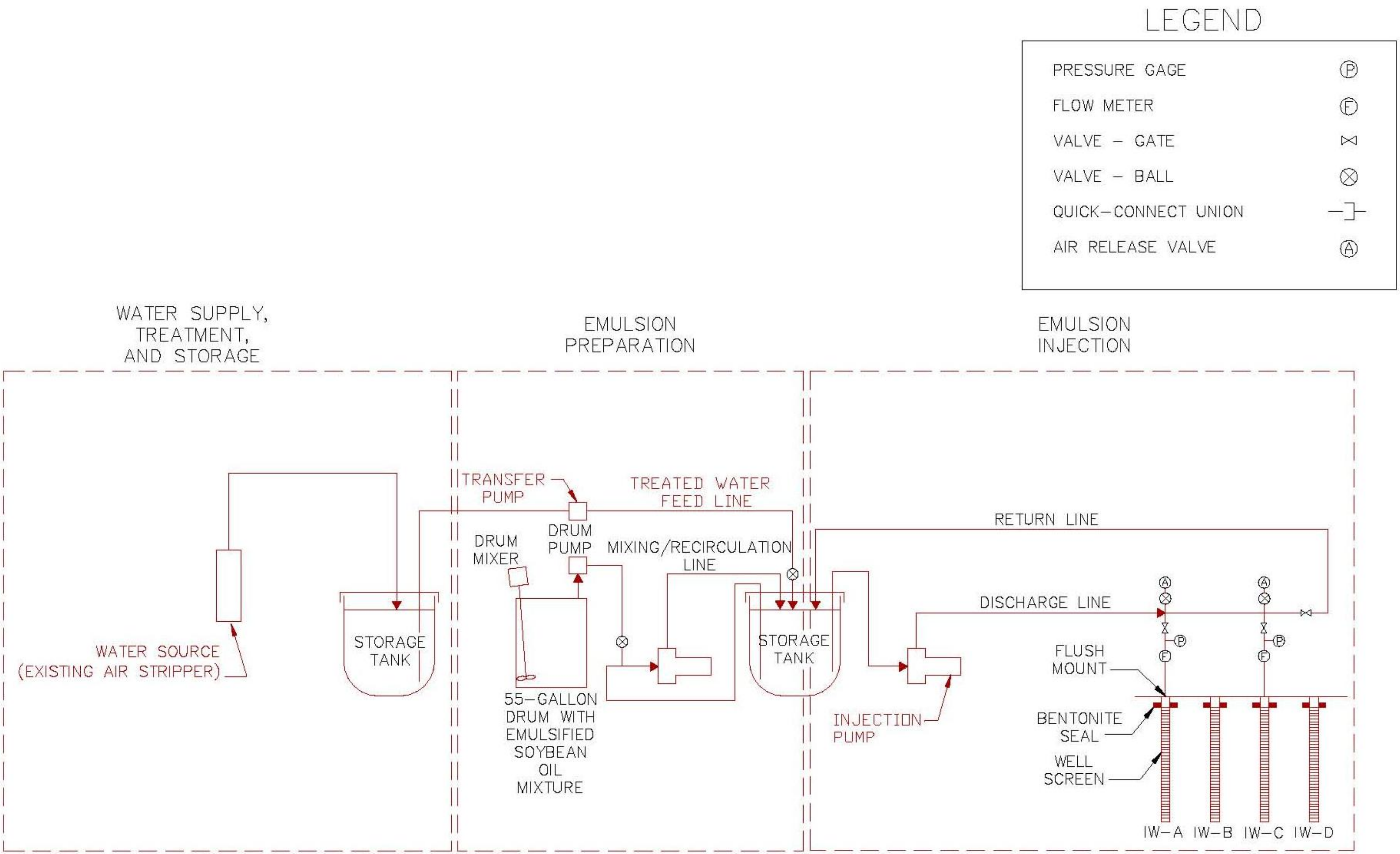
3. Upcoming Direct Push Technology drilling and well installation at LHAAP-37, 50, 58 in the summer

4. LHAAP-03 Proposed Plan Public Meeting on June 11th

5. LHAAP-29 Field Planning underway

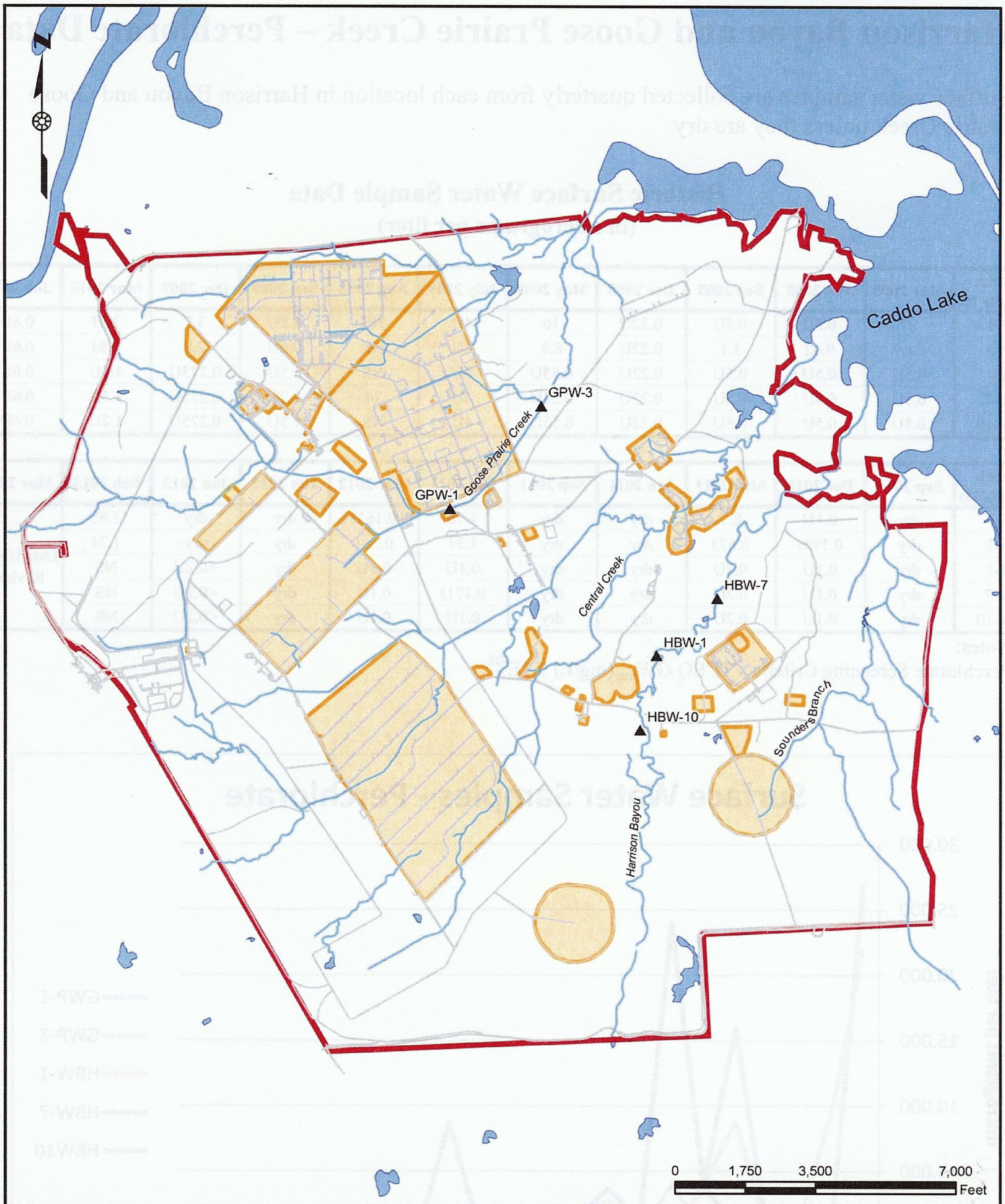
Back-up Slides

In-situ Bioremediation



AECOM

00119072



Legend

- ▲ Surface Water Sampling Location
- Stream
- Road
- Site
- Lake

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

SURFACE WATER SAMPLING LOCATION

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Harrison Bayou and Goose Prairie Creek – Perchlorate Data

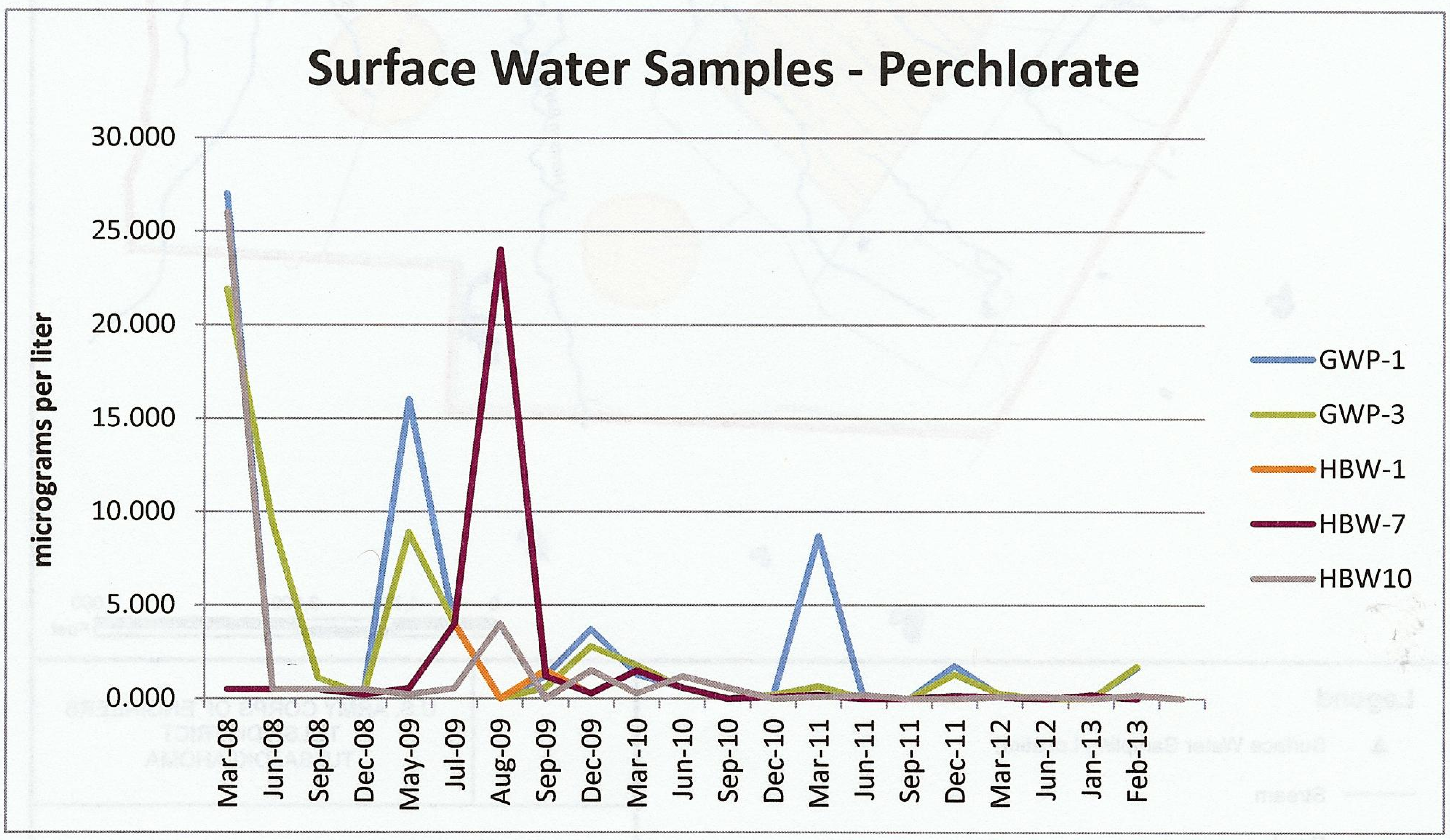
Surface water samples are collected quarterly from each location in Harrison Bayou and Goose Prairie Creek unless they are dry.

Historic Surface Water Sample Data
(in micrograms per liter)

Creek Sample ID	Mar 2008	Jun 2008	Sep 2008	Dec 2008	May 2009	July 2009	Aug 2009	Sep 2009	Dec 2009	Mar 2010	Jun 2010
GPW-1	27	0.5U	0.5U	0.22U	16	4U	NS	1.2U	3.7	1.3J	0.6U
GPW-3	21.9	9.42	1.1	0.22U	8.9	4U	NS	0.6U	2.8	1.8J	0.6U
HBW-1	0.5U	0.5U	0.5U	0.22U	0.55U	4U	NS	1.5U	0.275U	1.5U	0.6U
HBW-7	0.5U	0.5U	0.5U	0.22U	0.55U	4U	24	1.2U	0.275U	1.5U	0.6U
HBW-10	0.5U	0.5U	0.5U	0.22U	0.55U	4U	NS	1.5U	0.275U	1.2U	0.6U

Creek Sample ID	Sep 2010	Dec 2010	Mar 2011	Jun 2011	Sep 2011	Dec 2011	Mar 2012	Jun 2012	Jan 2013	Feb 2013	Mar 2013
GPW-1	dry	0.1U	8.7	dry	dry	1.76	0.163J	dry	dry	1.65	Data Under Review
GPW-3	dry	0.199J	0.673	dry	dry	1.31	0.261	dry	dry	1.74	
HBW-1	dry	0.1U	0.2U	dry	dry	0.1U	0.1U	dry	<0.2U	NS	
HBW-7	dry	0.1U	0.2U	dry	dry	0.171J	0.1U	dry	<0.2U	NS	
HBW-10	dry	0.1U	0.2U	dry	dry	0.1U	0.1U	dry	<0.2U	NS	

Notes:
Perchlorate Screening Criteria - TCEQ GW_{Ing} (mg/L) $5.1E^{-02}$



Groundwater Treatment Plant - Treated Groundwater Volumes

The amount of groundwater treated is determined by measuring the number of gallons of treated water returned to LHAAP-18/24, released to the INF Pond, or discharged to Harrison Bayou. The Army is currently completing a study to confirm flow numbers and material balance for the Groundwater Treatment Plant. This sheet will be updated with any new findings.

Treated Water Data
(in gallons)

Oct-07	Nov-07	Dec-07	Jan-08	Feb-08	Mar-08	Apr-08	May-08	Jun-08	Jul-08	Aug-08	Sep-08
1,041,491	848,356	804,822	792,148	665,883	818,872	791,306	568,812	776,904	748,377	690,052	617,199

Oct-08	Nov-08	Dec-08	Jan-09	Feb-09	Mar-09	Apr-09	May-09	Jun-09	Jul-09	Aug-09	Sep-09
655,059	619,274	726,118	552,299	598,144	433,800	488,807	526,958	387,644	0	414,853	735,716

Oct-09	Nov-09	Dec-09	Jan-10	Feb-10	Mar-10	Apr-10	May-10	Jun-10	Jul-10	Aug-10	Sep-10
808,322	636,306	727,492	391,898	695,343	802,656	894,731	962,121	1,257,977	1,314,924	1,041,495	1,136,547

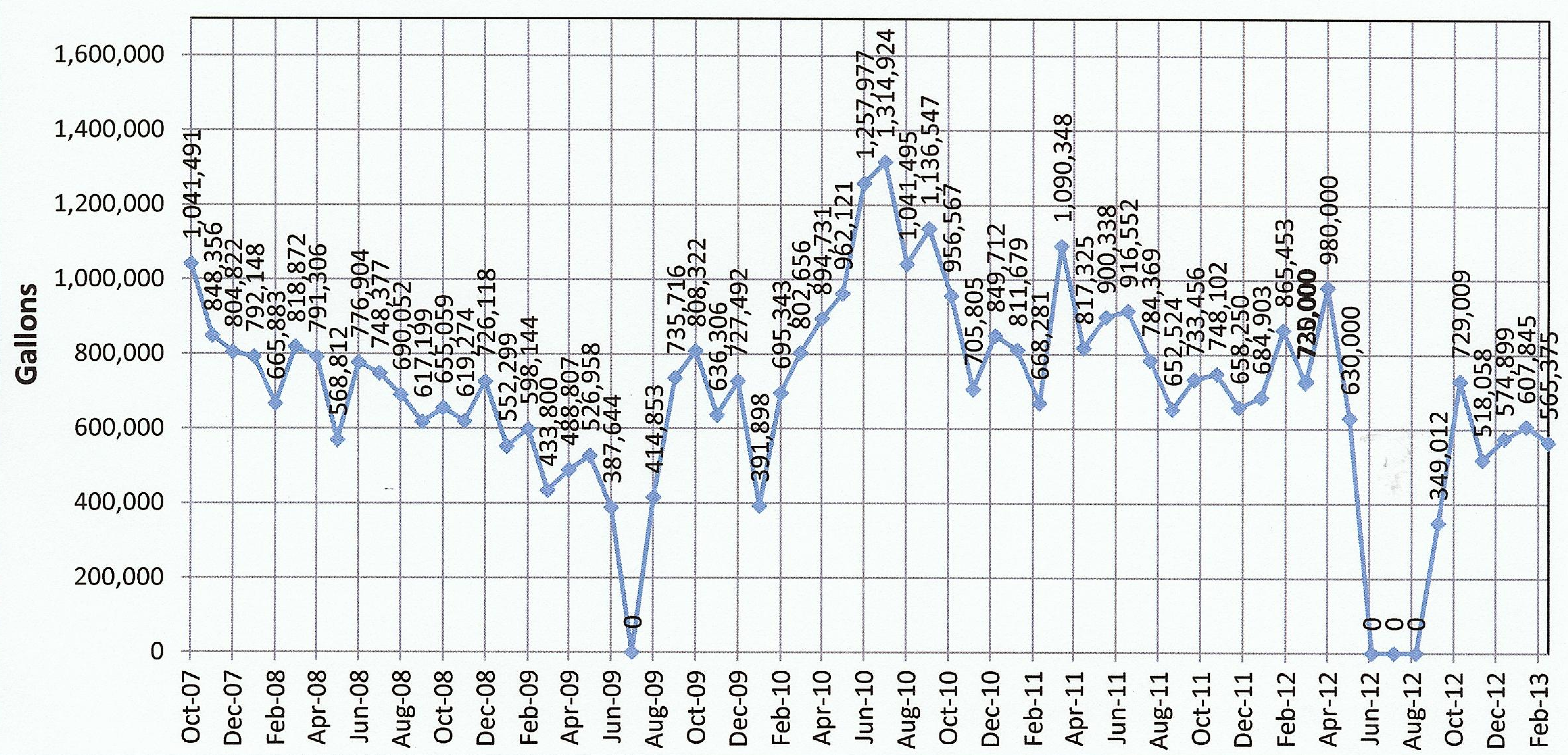
Oct-10	Nov-10	Dec-10	Jan-11	Feb-11	Mar-11	Apr-11	May-11	Jun-11	Jul-11	Aug-11	Sep-11
956,567	705,805	849,712	811,679	668,281	1,090,348	817,325	900,338	916,552	784,369	652,524	733,456

Oct-11	Nov-11	Dec-11	Jan-12	Feb-12	Mar-12	Apr-12	May-12	Jun-12	Jul-12	Aug-12	Sep-12
748,102	658,250	684,903	865,453	725,000*	730,000*	980,000*	630,000*	0	0	0	349,012

Oct-12	Nov-12	Dec-12	Jan-13	Feb-13
729,009	518,058	574,899	607,845	565,375

* Indicates estimate

Figure ES-3
Water Treated Monthly from October 2007 through March 2013



LONGHORN ARMY AMMUNITION PLANT
Karnack, Texas

MONTHLY MANAGERS' MEETING

Minutes

DATE:	April 4, 2013
TIME:	10:00 a.m.
PLACE:	**LHAAP Army Trailer**

Welcome **RMZ**

Attendees:

Army BRAC: Rose Zeiler
EPA: Rich Mayer, Kent Becher (USGS)
TCEQ: April Palmie, Dale Vodak, Jack Holsomback (Guest of TCEQ-Tyler)
USACE: Wendy Lanier, Aaron Williams
USFWS: Paul Bruckwicki
AECOM: Dave Wacker, Gretchen McDonnell, Josh Miller (by phone), Ali Smith (by phone), JoLynn Snow (by phone), Marwan Salameh (by phone)
AEC: Marilyn Plitnik (by phone), Robin Paul (by phone)

Gretchen McDonnell provided a review of photographs depicting the ongoing field work at LHAAP-18/24, LHAAP-46 and LHAAP-67 on poster boards planned for presentation to the RAB.

Action Items
AECOM

- Submit proposed 2013 groundwater monitoring schedule for Army and agency review. **Pending** - In internal Army review.
- Compile interim data submittal for the next MMM. **On-going**.
- Reduce number of document hard copies being sent to Mr. Bruckwicki to a single copy. **Complete.**
- Reorganize Document and Issue Tracking document by Due Date. Add a column to clearly show the date the document will be submitted to the agencies. **Complete.** Tracker was re-organized to focus on the month's upcoming priorities to make it more useful, and will modify as necessary going forward.

Army

- Work with APG to arrange LHAAP-37 Bioplug presentation for July RAB meeting. **Pending.** A presentation is tentatively scheduled for the July RAB, but we may want to wait until the September RAB to have more data to review.
- Submit LHAAP-18/24 Schedule Extension Request Letter for Draft Feasibility Study and Draft Proposed Plan deadlines by mid-April. Done**.**
- Combine decision documents for LHAAP-19, LHAAP-56, LHAAP-65 and LHAAP-69 before returning them to TCEQ, for TCEQ staffing purposes. **Pending.**

EPA

- EPA will provide an opinion on whether elimination of the Catox from the treatment train should be a ROD amendment or an ESD. **Complete.**

- Supply September 2012 split-sampling event quality report. **Complete.**

TCEQ
None

AEC
None

Defense Environmental Restoration Program (DERP) PBR Update AECOM

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

Item 1 (LHAAP-04 ROD) - April 30th deadline for agency comments. Draft final is due May 31st.

Item 2 (LHAAP-03 Proposed Plan) – April 29th deadline for agency comments. AECOM proposed public meeting date for June 11. Travel restrictions on government personnel will likely mean complications for them to attend. Review of the enforceable schedule appears to require public meeting date in May to keep up with enforceable schedule. Army will examine the enforceable schedule and determine the required date.

Item 3 (LHAAP-58 Army Draft RAWP/TS) – Review period extended to May 31st based upon FFA parties agreement. Draft submittal contains three sets of treatability study data, and AECOM will be sending additional treatability study results as they become available for integration into agency review.

Item 4 (LHAAP-47 ROD) – Currently in Army review. Due to agencies on April 30th.

Item 5 and 6 (LHAAP-37 Draft RAWP and LHAAP-50 Draft RAWP) – Upon agency review of RTCs, agencies will provide an email advising Army of any concerns with those comment responses. Then, a teleconference will be scheduled to discuss/resolve any continuing issues before the RTC is finalized.

Item 7 (1,4-Dioxane Sampling) – Army planning to send a memo with proposed sampling plan to agencies by April 12th.

Item 8 (5-Year Review Report) – Currently in internal Army review. Mr. Mayer stated that EPA HQ may want to do a concurrent review of the report with regional EPA. Army believes time has been included in the schedule to accommodate that EPA Headquarters review. AECOM will put proposed milestones for the review into the transmittal letter for the draft document. Agencies should have the draft by the middle of May if Army comments are completed by April 19th.

Item 9 (LHAAP-17 RD WP) – The next submittal for this site will be a Pre-Design Investigation Work Plan to collect some additional soil and aquifer data required to complete the RD.

Item 10 (LHAAP-29 PSI WP) – In Army review, Submittal to the agencies planned for later in April.

Item 11 (LHAAP-16 RD WP) – In Army review.

Item 12 (Compliance Sampling) – Surface water and perimeter wells completed. LHAAP-18/24 wells will be completed after incorporation of all new wells from current PSI effort.

Item 13 (Monthly Managers' Meeting) – May teleconference scheduled for 10AM on the 16th. **(Note: Meeting was subsequently rescheduled for May 30th at 2PM at the LHAAP Army Trailer.)**

Item 14 (April RAB) – All action items completed.

Item 15 (GWTP O&M/Air Monitoring) – INF Pond liner has been covered with clay. Waiting for topsoil and seeding until weather improves. ESD packet being prepared to formally eliminate the catalytic oxidizer from the groundwater treatment plant air treatment process as air samples have been meeting Texas air standards without catox treatment. EPA stated ESD is suitable but Army must comply with the NCP criteria and ensure there is a contingency plan if air emissions become an issue and the contaminant load processed by the plant increases. Army will discuss this change during the RAB tour of the facility. The ESD will be added to the Document and Issue Tracker table.

Item 16 (Admin Record Update) – In progress

Item 17 (BERA Addendum Work Plan) – In Army review. Submittal to agencies is anticipated for end of April.

Item 20-22 (LHAAP-18/24 PSI WP and CSM, LHAAP-46 and LHAAP-67) – At the beginning of the meeting, Ms. McDonnell provided a summary of recent field activities using a set of photographs capturing various elements of the work.

- Upcoming field work – Drilling work continues on LHAAP-18/24 to gather data supporting remedy selection, and on LHAAP-46 and LHAAP-67 to install the selected remedy. LHAAP-18/24 compliance sampling is planned for May. Mr. Mayer stated that EPA may be doing some split sampling during an upcoming monitoring event.

- Monthly data – Submittal in Army review. Will be submitted to regulators within the next couple of weeks. Some data will be reported during the April RAB meeting. Data sets to be included are surface water/perimeter wells, GWTP water and GWTP air sampling. March 2013 LHAAP-37 bio-plug data will not be included until validated

- Quarterly reports – Quarter ended March 31st. Add next report to document tracker. EPA has recently provided comments on the last quarterly report. EPA identified potential discrepancy between water table levels table and map, which AECOM will review for potential correction. Mr. Becher also commented on nutrient levels in GWTP effluent and asked AECOM how those levels were reported (nitrate as N? Phosphorus as P?).

- Groundwater Treatment Plant
    - Air Monitoring - continuing
    - INF Pond Topsoil and erosion control status – clay applied
    - GWTP Longer-Term Plan – ESD for catox removal is being prepared.

Other DERA Program Update **Army**

- Status of Supplemental BERA

- Five Year Review Report Update – (discussed in item 8 above)
- Sitewide LUC Management Plan - annual update. EPA will be sending signed document to Army.

MMRP Update **Army**

- Update – No update. Will visit these sites on RAB tour.

Other Environmental Restoration **Army**

- CRP/CIP Update – Agencies completed back-check and hard copies will be submitted to RAB for review.
- Site 19 Decision Document update – in progress
- Decision Document for multiple sites – in progress
- Site 37 Bioplug – Validated data will be forwarded to agencies upon receipt.
- 1,4-dioxane sampling at Longhorn – Official two-week notice will be given to agencies, but sampling tentatively planned three weeks away.

Programmatic Issues **RMZ/RM/AP**

- Status of Dispute – Awaiting submittal of Regional Administrator decision to EPA Headquarters.

USFWS Update **RMZ/PB**

- Environmental Restoration Issues with Transfer Schedule Impact – No current issues.
- USFWS Comments on Documents – No current issues.

Schedule Next Managers' Meeting

- May Monthly Managers' Meeting – May 16th at 10AM, by teleconference. **(Note: Meeting was subsequently rescheduled for May 30th at 2PM, at the LHAAP Army Trailer.)**

Adjourn

New Action Items

AECOM

- Submit Field Standard Operating Procedures to agencies by April 15th.
- Upon receipt of email detailing agency concerns with LHAAP-37 RAWP/TS RTCs, schedule a teleconference to resolve agency those concerns prior to finalizing the RTC document.
- Include review and submittal milestone dates in the transmittal letter for the draft 5-Year Review Report
- Review GWTP quarterly report for potential discrepancy between water elevation table and map.
- Determine how effluent nutrient levels are reported (nitrate as N? Phosphorus as P?) and advise EPA.
- Add next GWTP quarterly report and ESD to Document and Issue Tracker table.
- Notify agencies two weeks in advance of 1,4-dioxane sampling.

Army

- Army will examine the enforceable schedule and determine the required date for the LHAAP-03 Proposed Plan public meeting.

- Submit validated data for LHAAP-37 Bioplug Study to agencies.

EPA

- Provide to Army an email with any concerns/issues with LHAAP-37 RAWP/TS RTCs.
- Send signed annual document control page of the Sitewide LUC Management Plan to Army

TCEQ

- Provide to Army an email with any concerns/issues with LHAAP-37 RAWP/TS RTCs.

Attachments:
April 2013 Monthly Managers' Meeting Agenda
April 4, 2013 Document and Issue Tracker

ACRONYM LIST

AEC	**United States Army Environmental Command**
AECOM	**AECOM Technology Services, Inc.**
AP	**April Palmie**
APG	**Aberdeen Proving Grounds**
BERA	**Baseline Environmental Risk Assessment**
Catox	**Catalytic Oxidizer**
CRP/CIP	**Community Relations Plan / Community Involvement Plan**
DERA	**Defense Environmental Restoration Act**
DERP	**Defense Environmental Restoration Program**
EPA	**United States Environmental Protection Agency**
ESD	**Explanation of Significant Differences**
FFA	**Federal Facilities Agreement**
GWTP	**Ground Water Treatment Plant**
INF	**Intermediate-Range Nuclear Forces**
LHAAP	**Longhorn Army Ammunition Plant**
LUC	**Land Use Controls**
MMM	**Monthly Managers' Meeting**
MMRP	**Military Munitions Response Program**
NCP	**National Oil and Hazardous Substances Pollution Contingency Plan**
O&M	**Operation and Maintenance**
PB	**Paul Bruckwicki**
PBR	**Performance-Based Remediation**
PSI WP	**Post Screening Investigation Work Plan**
RAB	**Restoration Advisory Board**
RAWP	**Remedial Action Work Plan**
RD	**Remedial Design**
RM	**Rich Mayer**
RMZ	**Rose M. Zeiler**
ROD	**Record of Decision**
RTC	**Response to Comments**
TCEQ	**Texas Commission on Environmental Quality**
TS	**Treatability Study**
USACE	**United States Army Corps of Engineers**
USFWS	**United States Fish and Wildlife Service**
USGS	**United Stated Geological Survey**

LONGHORN ARMY AMMUNITION PLANT
Karnack, Texas

MONTHLY MANAGERS' MEETING

Agenda

DATE: April 4, 2013
TIME: 10:00 a.m.
PLACE: **LHAAP Army Trailer**

Welcome **RMZ**

Action Items
AECOM
- Submit proposed 2013 groundwater monitoring schedule for Army and agency review.
- Compile interim data submittal for the next MMM.
- Reduce number of document hard copies being sent to Mr. Bruckwicki to a single copy.
- Reorganize Document and Issue Tracking document by Due Date. Add a column to clearly show the date the document will be submitted to the agencies.

Army
- Work with APG to arrange LHAAP-37 Bioplug presentation for June RAB meeting.
- Submit LHAAP-18/24 Schedule Extension Request Letter for Draft FS and Draft PP deadlines by mid-April.
- Hold internal discussion on how to proceed with LHAAP-29 PSI WP.
- Discuss internally if there is a more visual schedule than the FFA Excel-format schedule that can be provided to TCEQ.
- Combine decision documents for LHAAP-19 and LHAAP-03 before returning them to TCEQ, for TCEQ staffing purposes.

EPA
- EPA will provide an opinion on whether elimination of the Catox from the treatment train should be a ROD amendment or an ESD.
- Supply September 2012 split-sampling event quality report.

TCEQ

AEC

Defense Environmental Restoration Program (DERP) PBR Update **AECOM**
- Upcoming document submissions to regulators (see Document and Issue Tracking table)
- Upcoming field work
- Monthly data
- Quarterly reports
- Groundwater Treatment Plant
  - Air Monitoring
  - INF Pond Topsoil and erosion control status
  - GWTP Longer-Term Plan

Other DERA Program Update **Army**

- Status of Supplemental BERA
- Five Year Review Report Update
- Sitewide LUC Management Plan – annual update

MMRP Update **Army**

- Update

Other Environmental Restoration **Army**

- CRP/CIP Update
- Site 19 Decision Document update
- Decision Document for multiple sites
- Site 37 Bioplug
- 1,4-dioxane sampling at Longhorn

Programmatic Issues **RMZ/RM/AP**

- Status of Dispute

USFWS Update **RMZ/PB**

- Environmental Restoration Issues with Transfer Schedule Impact
- USFWS Comments on Documents

Schedule Next Managers' Meeting

- Discussion of April 4th 2013 RAB Activities Schedule

10:00-12:00 Managers Meeting in Army Trailer
2:00-4:00 RAB Tour
4:30-6:00 RAB Meeting

- April Monthly Managers' Meeting

Adjourn

ACRONYM LIST

AEC	**United Stated Army Environmental Command**
AECOM	**AECOM Technology Services, Inc.**
AP	**April Palmie**
APG	**Aberdeen Proving Grounds**
AR	**Administrative Record**
BERA	**Baseline Environmental Risk Assessment**
Catox	**Catalytic Oxidizer**
CRP/CIP	**Community Relations Plan / Community Involvement Plan**
DERA	**Defense Environmental Restoration Act**
DERP	**Defense Environmental Restoration Program**
EPA	**United States Environmental Protection Agency**
ESD	**Explanation of Significant Differences**
FFA	**Federal Facilities Agreement**
FS	**Feasibility Study**
GWTP	**Ground Water Treatment Plant**

INF	**Intermediate-Range Nuclear Forces**
LHAAP	**Longhorn Army Ammunition Plant**
LUC	**Land Use Controls**
MMM	**Monthly Managers' Meeting**
MMRP	**Military Munitions Response Program**
PB	**Paul Bruckwicki**
PBR	**Performance-Based Remediation**
PP	**Proposed Plan**
PSI WP	**Post Screening Investigation Work Plan**
RAB	**Restoration Advisory Board**
RM	**Rich Mayer**
RMZ	**Rose M. Zeiler**
ROD	**Record of Decision**
RTC	**Response to Comments**
TCEQ	**Texas Commission on Environmental Quality**
USACE	**United States Army Corps of Engineers**
USFWS	**United States Fish and Wildlife Service**

Document and Issue Tracking (Monthly Manager's Meeting)
Longhorn Army Ammunition Plant
April 4, 2013

Item	Description	Next Action	Due Date	Status	Remarks
1	LHAAP-04 ROD	EPA/TCEQ review	04/30/13		Draft Final due to EPA/TCEQ May 31
2	LHAAP-03 Proposed Plan	EPA/TCEQ review	04/29/13	Public Meeting June 11	Draft Final due to EPA/TCEQ May 31
3	LHAAP-58 Army Draft RAWP/TS	EPA/TCEQ review	05/31/13		Draft Final due to EPA/TCEQ June 28/13
4	LHAAP-47 ROD	Army review Army Draft	04/05/13		Draft due to EPA/TCEQ April 30
5	LHAAP-37 Draft RAWP	AECOM drafting RTC	04/15/13	TCEQ comments rcvd 03/14 EPA comments rcvd 03/25	DF due to EPA/TCEQ April 30
6	LHAAP-50 Draft RAWP	AECOM drafting RTC	04/15/13	TCEQ comments rcvd 03/14 EPA comments rcvd 03/15	DF due to EPA/TCEQ April 30
7	1, 4 Dioxane Sampling	AECOM update Draft Proposed Sampling Memo	04/12/13		
8	5 Year Review	Army review Army Draft	04/19/13		

Document and Issue Tracking (Monthly Manager's Meeting)
Longhorn Army Ammunition Plant
April 4, 2013

Item	Description	Next Action	Due Date	Status	Remarks
9	LHAAP-17 RD WP	AECOM Submit Army Draft	04/08/13	PDI WP in progress for soil sampling and aquifer testing	
10	LHAAP-29 PSI WP	Army review Army Draft	04/19/13	In-progress	
11	LHAAP-16 RD WP	Army reviewing Army Draft	04/01/13	In-progress	
12	Compliance Sampling	AECOM complete required sampling	04/26/13	18/24 wells planned for late March/early April. Updated 2013 GW sampling schedule in progress	
13	Monthly Manager's Meeting	Complete Minutes and Agenda	04/04/13	MMM, April 4 Meeting minutes and agenda sent out 03/28	
14	April RAB	AECOM complete prep	04/04/13		
15	GWTP O&M/Air Monitoring	Continued O&M	03/31/13	- INF Pond Liner repair complete, top soil/seed awaiting better weather - PBR Air – ESD approved, AECOM reassessing draft language for Army	

Document and Issue Tracking (Monthly Manager's Meeting)
Longhorn Army Ammunition Plant
April 4, 2013

Item	Description	Next Action	Due Date	Status	Remarks
				review - Materials Balance under review	
16	Admin Record update	AECOM provide to EPA/TCEQ	04/05/13	Send to EPA/TCEQ	
17	BERA Addendum Work Plan	Submit Army Draft	3/30/13		
18	BERA Field Work	Initiate Field Work	TBD		
19	BERA Addendum	Submit Army Draft	TBD		
20	LHAAP-18/24 PSI WP and CSM	Complete Field Activities	April	Discuss Progress	
21	LHAAP-46 RAWP	Complete Field Activities	April	Discuss Progress	Completion required by April 30
22	LHAAP-67 RAWP	Complete Field Activities	April	Discuss progress	Completion required by April 30

AECOM

MEMORANDUM FOR RECORD

30 April 2013

PROJECT NAME: **Remediation of Multiple Sites, Longhorn Army Ammunition Plant**

TO: John Lambert, USACE Project Manager
Longhorn Army Ammunition Plant, Karnack, TX
(Contract: W912DY-09-D-0059, Task Order DS01)

FROM: Dave Wacker
AECOM Project Manager, 210-253-7514

SUBJECT: **Notification of Remedial Action Well Construction Completion, LHAAP-46, Plant 2 Area**

This memorandum documents the Construction Completion of the Monitored Natural Attenuation (MNA) monitoring network for LHAAP-46 consistent with the Remedial Action Work Plan for LHAAP-46 (AECOM, 2013). Seven wells were planned for installation as part of the MNA Remedial Action. Seven wells were installed, in addition to an eighth well in order to achieve Remedy in Place for the site.

Please feel free to contact me at 210-253-7514 with questions.

Sincerely,

Dave Wacker

MEMORANDUM FOR RECORD

30 April 2013

PROJECT NAME: **Remediation of Multiple Sites, Longhorn Army Ammunition Plant**

TO: John Lambert, USACE Project Manager
Longhorn Army Ammunition Plant, Karnack, TX
(Contract: W912DY-09-D-0059, Task Order DS01)

FROM: Dave Wacker, AECOM Project Manager, 210-253-7514

SUBJECT: **Notification of Remedial Action Well Construction Completion, LHAAP-67, Aboveground Storage Tank Farm**

This memorandum documents the Construction Completion of the Monitored Natural Attenuation (MNA) monitoring network for LHAAP-67 consistent with the Remedial Action Work Plan for LHAAP-67 (AECOM, 2013). Six wells were planned for installation as part of the MNA Remedial Action. Six wells were installed in order to achieve Remedy in Place for the site.

Please feel free to contact me at 210-253-7514 with questions.

Sincerely,

Dave Wacker

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FINAL
PROPOSED PLAN
FOR LHAAP-03
FORMER WASTE COLLECTION PAD
BUILDING 722-P PAINT SHOP
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM Technical Services

May 2013

THE U.S. ARMY ANNOUNCES THE PROPOSED PLAN FOR LONGHORN ARMY AMMUNITION PLANT LHAAP-03 (FORMER WASTE COLLECTION PAD NEAR BUILDING 722-P, PAINT SHOP)

1.0 INTRODUCTION

The United States (U.S.) Army is issuing this Proposed Plan for public comment and participation in accordance with Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended, and Section 300.430(f)(2)of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (Title 40 Code of Federal Regulations Part 300).

The primary purpose of the Proposed Plan is to facilitate public involvement in the remedy selection process for environmentally impacted sites. It provides the public with basic background about Longhorn Army Ammunition Plant (LHAAP) and Site LHAAP-03, the rationale for selecting the Preferred Alternative, and summaries of other alternatives considered for protecting human health and the environment from the chemicals of concern, arsenic and lead, detected in the soil. The LHAAP-03 Site is estimated to contain between 50 and 150 cubic yards of soil exceeding screening levels and is contained entirely within the LHAAP-58 boundary. For this reason, this proposed plan addresses the soil removal action at LHAAP-03 only and all other monitoring and reporting requirements associated with groundwater and land use, including CERCLA five year reviews, will be met under LHAAP-35A(58). The Preferred Alternative for the LHAAP-03 Site is Alternative 2: Excavation and Off-Site Disposal. Additional detail on the Preferred Alternative is provided below. Because of the extremely limited extent of the soil contamination, No Action was the only other alternative considered.

The U.S. Army, the lead agency for environmental response actions at LHAAP, is acting in partnership with the United States Environmental Protection Agency (USEPA) Region 6 and the Texas Commission on Environmental Quality (TCEQ). As the lead agency, the U.S. Army is charged with planning and implementing remedial actions at the LHAAP. Regulatory agencies assist the U.S. Army by providing technical support, project

DATES TO REMEMBER

PUBLIC COMMENT PERIOD:

May 13, 2013 to June 12, 2013

The U.S. Army invites you to participate during the public comment period by submitting comments on the LHAAP-03 Proposed Plan. The U.S. Army will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING: The U.S. Army will hold a public meeting to explain the Proposed Plan for LHAAP-03. Oral and written comments will be accepted at the meeting. The meeting will be held on May 30, 2013 from 6:00 p.m. to 8:00 p.m. at Karnack Community Center.

For more information, see the Administrative Record at the following location:

Marshall Public Library

300 S. Alamo

Marshall, Texas 75670

Business Hours: Monday – Thursday (10.00 a.m. – 8.00 p.m.)

Friday – Saturday (10.00 a.m. – 5.00 p.m.)

For further information on LHAAP-03, please contact:

Dr. Rose M. Zeiler
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Longhorn Army Ammunition Plant
P.O. Box 220
Ratcliff, Arkansas 72951
Phone No.: 479-635-0110
E-mail address: rose.zeiler@us.army.mil

review, project comment, and oversight in accordance with the CERCLA as amended by Superfund Amendments and Reauthorization Act and the LHAAP Federal Facilities Agreement (FFA).

Contaminated soil at the LHAAP-03 Site will be removed under the Preferred Alternative, Alternative 2, eliminating the potential threat to groundwater at the Site. This Plan addresses soil contamination and is the planned final remedy for contamination at the LHAAP-03 Site. A groundwater sample from the monitoring well located at the Site (03WW01) in November 2008 showed arsenic concentrations above the groundwater Maximum Contaminant Level (MCL). With removal of the impacted soil acting as a potential source of groundwater contamination and because LHAAP-03 consists of a small area located within the larger LHAAP-35A(58) Site, groundwater monitoring for arsenic will be completed as part of the planned Remedial Action for LHAAP-35A(58).

The U.S. Army, in consultation with the USEPA Region 6 and the TCEQ, will select a final remedy for the LHAAP-03 Site after reviewing and considering all information submitted during the 30-day public comment period (see details on Page 1). The U.S. Army may modify the Preferred Alternative or select another response action presented in the Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on both alternatives presented in the Proposed Plan.

This Proposed Plan summarizes LHAAP-03 Site information contained in the Administrative Record file and Remedial Investigation/Focused Feasibility Study (RI/FFS) report for LHAAP-03. Relevant information in this Proposed Plan is presented in the following sections:

1.0 Introduction
2.0 Site Background
3.0 Site Characteristics
4.0 Scope and Role
5.0 Risk Summary
6.0 Remedial Action Objectives
7.0 Summary of Remedial Alternatives
8.0 Evaluation of Alternatives
9.0 Summary of the Preferred Alternative
10.0 Community Participation
11.0 References and Documents Reviewed

2.0 SITE BACKGROUND

The LHAAP is located in central-east Texas in the northeastern corner of Harrison County (Figure 1). The installation occupies approximately 1,400 of its former 8,416 acres between State Highway 43 at Karnack, Texas, and the western 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.

The U.S. Army has transferred nearly 7,000 acres to the U.S. Fish and Wildlife Service for management as Caddo Lake National Wildlife Refuge. The property transfer process is continuing as response actions are completed at individual sites. The Longhorn Restoration Advisory Board has been kept informed of investigations and progress at LHAAP and Site LHAAP-03 through regular quarterly meetings. Additionally, the Administrative Record is updated at least twice per year and is available at the Marshall Public Library (see details on Page 1).

LHAAP-03 was not listed on the National Priorities List (NPL) when LHAAP was initially added in 1990. However, due to releases of chemicals from operations at the facility, LHAAP-03 was added to the NPL by the FFA parties in 2011. Activities to remediate contamination associated with the listing of LHAAP as a NPL site began in 1990. The U.S. Army, the USEPA, and the Texas Water Commission (currently known as the TCEQ) have entered into a CERCLA Section 120 FFA since that time 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.

A Site description of LHAAP-03, Site characteristics, and a summary of Site risks are provided below followed by a discussion of remedial alternatives and the Preferred Alternative recommendation.

LHAAP-03, known as Site 03, or the Former Waste Collection Pad, is approximately 50 feet to the west of former Building 722-P, paint shop (Figure 2). LHAAP-03 was a waste collection Site outside of the paint shop at Building 722-P, which was at the Maintenance Shop Area within the boundary of LHAAP-35A(58). Building 722-P was used for paint spraying and polyurethane spray coating of various items. Heavy metal-based primers, other waste paint, waste solvents and contaminated rags were collected in a 55-gallon drum on a gravel pad in an open-sided shed. Full drums were taken to Building 31-W for disposal. Building 722-P has been demolished. Potential Site-related chemicals at LHAAP-03 were metals, volatile organic compounds (VOC), and semi-volatile organic compounds (SVOC) (Plexus Scientific Corporation, 2005).

Various investigations have been conducted at LHAAP-03 to evaluate the nature and extent of soil and groundwater impact at the Site. These investigations have included multiple rounds of soil sampling and analyses, installation of a groundwater monitoring well, and groundwater sampling and analyses. All sampling activities and laboratory analytical methods were in accordance with the Installation-Wide Work Plan (Shaw, 2006). LHAAP-03 lies entirely within LHAAP-35A(58) and groundwater is being addressed as part of the planned remedial action for the larger Site, LHAAP-35A(58). Multiple soil sampling events were conducted at LHAAP-03 from 2006 through 2007. The soil sampling activities included collection of samples from more than 17 locations at depths ranging from surface (0 to 0.5 feet below ground surface [bgs]) to 15 feet bgs. The samples were analyzed in the laboratory for metals, and soil samples were found to contain lead, arsenic, VOCs, and SVOCs (Shaw, 2009).

3.0 SITE CHARACTERISTICS

LHAAP-03 lies above the Wilcox formation. This creates three groundwater zones at different depths. The groundwater flow in these zones is generally east-northeast in the direction of Caddo Lake, but varies by location. It should be noted that groundwater generally occurs under semi-confined conditions at LHAAP-03. The depth to groundwater across LHAAP varies with typical depths ranging from 12 to approximately 25 feet bgs.

This Proposed Plan addresses soil at LHAAP-03. As previously stated, groundwater monitoring for arsenic within LHAAP-03 will be completed as part of the planned Remedial Action for LHAAP-35A(58). The concentrations of chemicals detected in soil samples at LHAAP-03 were compared to the screening levels protective of human health and the environment. These screening levels are either published by the TCEQ or were calculated based on the TCEQ guidance.

This comparison indicated that VOCs and SVOCs, along with soil metal exposure levels at the surface, did not exceed their respective screening levels for direct exposure pathways in any soil sample. The comparison of metal concentrations with groundwater protection screening levels indicated that two metals, arsenic and lead, may pose a threat to groundwater quality at LHAAP-03. Therefore, these two metals were selected as target chemicals for soil remediation at LHAAP-03. Figure 3 shows the extent of arsenic and lead in soil at LHAAP-03, which is anticipated to consist of between 50 and 150 cubic yards of soil.

4.0 SCOPE AND ROLE OF THE PROPOSED REMEDY

This is the final planned Remedial Action for the LHAAP-03 Site. The soil contaminants of concern (COCs) are lead and arsenic. The Preferred Alternative of excavation and off-Site disposal of contaminated soil will remove the COCs in the soil and based upon the small area of soil above the clean-up levels (50-150 cubic yards) represents the best alternative. Because the LHAAP-03 Site is small and entirely contained within the LHAAP-35A(58) boundary, all other monitoring and reporting requirements associated with groundwater and land use, including the five year reviews, will be met under LHAAP-35A(58). The groundwater LUC restriction boundary that is presented in the LHAAP-35A(58) RD (Shaw, 2011a) as well as the nonresidential use boundary for LHAAP-35A(58) encompasses LHAAP-03. Further information on the restrictions can be found in the September 2010 LHAAP-35A(58) Record of Decision (ROD) and September 2011 Remedial Design. The monitoring of the LHAAP-03 groundwater is included in the LHAAP-58 Remedial Action Work Plan, as is the provision for all other LHAAP-03 monitoring and reporting requirements beyond the soil removal action. No separate ongoing administrative or response action will be required at LHAAP-03 after Alternative 2 is implemented.

5.0 SUMMARY OF LHAAP-03 SITE RISKS

Human Health Risk Assessment

A Human Health Risk Assessment (HHRA) for LHAAP-03 was conducted as part of risk assessment for the larger Site LHAAP-35A(58), which encompasses LHAAP-03. The HHRA included a calculation of cancer risks and non-cancer hazards for a hypothetical future maintenance worker under an industrial scenario for soil and groundwater. The cancer risk values were compared to the USEPA target risk range of 1×10^{-4} to 1×10^{-6}, and the non-cancer hazards were compared to the target hazard index of 1.

Soil

The major COCs found at the Site in soil are lead and arsenic. For the hypothetical future maintenance worker exposure to soil, the estimated hazard index is 0.47, below the benchmark of 1. The calculated carcinogenic risk is 2.1×10^{-5}, which is within the acceptable range (1×10^{-6} to 1×10^{-4}).

Groundwater

The VOC-impacted groundwater is unrelated to activities performed at LHAAP-03 and is being addressed as part of the planned remedial action for LHAAP-35A(58). The only groundwater COC above its respective TCEQ risk-based Medium Specific Concentration (groundwater – industrial level) and MCL of 0.01 milligrams per liter (mg/L) was arsenic at 0.0414 mg/L in one well (03WW01) (See Figure 3). This exceedance of arsenic above its MCL is believed to be due to anaerobic conditions (i.e., low dissolved oxygen) in groundwater and not from site operations.

All other metals were either not detected or were detected at concentrations below their respective MCLs or GW-Ind values. The risks regarding LHAAP-03's groundwater are discussed in more detail in the LHAAP-35A(58) ROD (Shaw, 2010).

The excavation proposed in Alternative 2 will destroy monitoring well 03WW01. Monitoring well 03WW01 will be abandoned in accordance with Texas Administrative Code, Title 16, Section 76.1004. The existing monitoring well 35AWW08 and the proposed new monitoring well 35AWW09 will be used as replacement for 03WW01 (See Figure 3).

Although the risks to human health due to soil contamination are within the acceptable industrial screening criteria range at LHAAP-03, a comparison of arsenic and lead concentrations in the soil with regulatory threshold values indicate that these metals may pose a threat to groundwater quality. Therefore, the U.S. Army's current judgment is that the Preferred Alternative identified in this Proposed Plan is necessary to protect public health, welfare, or the environment from actual or threatened impacts to groundwater from lead and arsenic in the soil.

Ecological Risk Assessment

The ecological risk for Site LHAAP-03 was addressed in the installation-wide Baseline Ecological Risk Assessment (BERA) completed in 2007 by Shaw. The BERA concluded that no unacceptable risk was present in the Industrial Sub-Area, where LHAAP-03 is located. Therefore, no further action is needed at LHAAP-03 for the protection of ecological receptors.

Data gap sampling is currently being conducted for explosives, and the results of this sampling will be incorporated into an addendum to the BERA. However, based on the historical use of the Maintenance Shop Area (the larger area within which LHAAP-03 is located), no change to the BERA conclusions are anticipated.

6.0 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) are established to protect human health and the environment while also meeting applicable or relevant and appropriate requirements (ARARs). The identification of RAOs must consider the environmental issues at the Site and the receptors that are affected. The primary environmental issue or COC at LHAAP-03 is arsenic and lead concentrations in the soil that have the potential to leach into the groundwater. Ecological risk is not a concern at LHAAP-03. Based on these considerations, the RAO for LHAAP-03 is presented below:

- Protect human health and the environment by minimizing the potential for leaching of COCs from impacted soil into underlying groundwater.

The remediation goals for the COCs in soil are presented below:

- Arsenic levels at 5.9 milligrams per kilogram (mg/kg) or less.
- Lead levels at 180 mg/kg or less.

7.0 SUMMARY OF REMEDIAL ALTERNATIVES

Seven remedial technologies/process options were screened as part of the Feasibility Study based on their effectiveness, implementability, and cost per the USEPA RI/FFS guidance. Based on this screening, only two remedial alternatives were retained for detailed evaluation due to the small area of impacted soil rendering several technologies/process options ineffective, either technically or based on costs. The evaluation of the limited set of alternatives is consistent with NCP, which states that the scope of the RI/FFS analysis should be tailored to the Site circumstances and complexity of Site problems.

The remedial alternatives are summarized below.

Alternative 1 – No Action

The No Action Alternative is required by CERCLA and serves as a baseline for comparison to other alternatives. Alternative 1 provides no monitoring, treatment, or remediation for soil.

There are no costs associated with the No Action alternative.

Estimated Total Present Worth (PW) *Cost: $0*

Alternative 2 – Excavation and Off-Site Disposal

This Alternative is the Preferred Alternative and involves the excavation and off-Site disposal of contaminated soil from LHAAP-03.

It is estimated that the total volume of contaminated soils to be excavated is 57 bank cubic yards, or 86 tons; however, soil sampling will be completed to confirm results meet applicable clean-up levels and excavation will continue until clean-up levels are achieved. All excavated material will be disposed at a permitted disposal facility. After excavation, confirmation samples will be collected and analyzed for metals. Once confirmation sampling results meet the proposed cleanup levels, the excavation areas will be backfilled with clean soil and reseeded.

All components of this action would use standard construction and operating procedures and routine sampling and analysis procedures. Details concerning operating procedures will be provided in a future design/work plan.

Implementation of this action may result in short-term impacts, such as minor fugitive dust emissions, storm-water runoff and precipitation/ infiltration in the excavation areas. These potential problems would be eliminated using appropriate engineering controls, such as water spraying, erosion and sediment control, and phased excavation areas.

No LUCs beyond those in place for the larger LHAAP-35A(58) will be implemented to address LHAAP-03.

Estimated Total PW Cost: $87,878

8.0 EVALUATION OF ALTERNATIVES

Nine criteria identified in the NCP, 300.430(f)(1)(i), are used to evaluate the different remediation alternatives individually and against each other in order to select a remedy. The evaluation includes threshold criteria (requirements that must be met) and balancing criteria (used to weigh trade-offs). The modifying criteria (anticipated agency and public acceptance) will be evaluated based on comments received on this Proposed Plan.

1. Overall Protection of Human Health and the Environment

No unacceptable risks to human health or the environment were determined to be associated with LHAAP-03 by the HHRA or BERA. However, metal concentrations in soil indicate the potential for contamination of groundwater in the future. Therefore, it was determined that addressing the metal contamination in soil was required to prevent potential impacts to groundwater resources at LHAAP.

The Excavation and Off-Site Disposal alternative is the most protective of groundwater. It involves the removal of impacted soil at LHAAP-03, and therefore is the alternative that includes active cleanup of the Site. This alternative meets the RAOs and is effective in preventing impacts to groundwater because contamination above the remedial goals is removed from the Site. The No Action alternative involves no actions to prevent impacts to groundwater resources.

2. Compliance with ARARs

ARARs are environmental laws that are identified on a Site-specific basis. The No Action alternative does not meet the chemical-specific ARARs because contaminant levels remain in the soil. The Excavation and Off-Site Disposal alternative involves actions to mitigate migration of contaminants from soil, and therefore is the alternative that meets chemical-specific ARARs.

3. Long-Term Effectiveness and Permanence

Over the long-term, the Excavation and Off-Site Disposal alternative would provide long-term effectiveness and permanence by preventing migration of contaminants from soil into groundwater. The No Action alternative is not effective in the long term.

4. Reduction in Toxicity, Mobility, or Volume Through Treatment

The No Action alternative does not provide reduction of toxicity, mobility, or volume of the contaminants. The Excavation and Off-Site Disposal alternative provides reduction of mobility because metals-contaminated soil is removed from the Site and placed in a permitted disposal facility. Toxicity and volume are not reduced by the Excavation and Off-Site Disposal alternative as the form and quantity of the contaminated soil is not altered.

5. Short-Term Effectiveness

Short-term effectiveness is not applicable to the No Action alternative. For the Excavation and Off-Site Disposal alternative, the use of proper dust suppressant measures would control windblown emissions of contaminated dust to protect the community and on-Site workers. Proper personal protective equipment would be required for Site workers. Measures to protect the environment are not expected for implementing the Excavation and Off-Site Disposal alternative.

The length of time required to implement and complete the remedial alternatives are as follows: Alternative 1 is a no action alternative, therefore, no time is required. The Excavation and Off-Site Disposal alternative, Alternative 2, has an estimated implementation duration of nine months.

6. Implementability

The alternatives are considered to be implementable.

7. Cost

The No Action alternative, which has no associated cost, is the least expensive alternative. The estimated net present-worth of

Alternative 2 is $87,878, for the period of excavation of nine months.

Alternative 1 Total PW Cost: $0

Alternative 2 (Preferred Alternative)

Total PW Cost: $87,878

8. State/Support Agency Acceptance

The State of Texas and the USEPA support the Preferred Alternative.

9. Community Acceptance

Public comments will be solicited as part of the public comment period on the Proposed Plan and incorporated into the Responsiveness Summary in the final ROD.

9.0 SUMMARY OF THE PREFERRED ALTERNATIVE

Based on the evaluation of alternatives, Alternative 2 (Excavation and Off-Site Disposal) is the Preferred Alternative for the LHAAP-03 because it:

- is protective of human health and the environment;
- complies with ARARs;
- is expected to achieve RAOs;
- has been shown to be both efficient and effective at other sites with similar contamination; and,
- is easy to implement with minimal adverse short-term impacts.

It is estimated that the total volume of contaminated soils to be excavated is 57 bank cubic yards, or 86 tons. The excavation area and volume will be further defined as part of pre-excavation sampling during the remedial action implementation. All excavated material would be disposed at a permitted disposal facility. After excavation, confirmation samples would be collected and analyzed for metals. Once confirmation sampling results meet the proposed cleanup levels, the excavation areas would be backfilled with clean soil and reseeded.

All components of this action would use standard construction and operating procedures and routine sampling and analysis procedures. Details concerning operating procedures will be provided in a future design/work plan. Implementation of this action may result in short-term impacts, such as fugitive dust emissions, storm-water runoff and precipitation/ infiltration in the excavation areas. These potential problems would be eliminated using appropriate engineering controls, such as water spraying, erosion and sediment control, and phased excavation areas or temporary sheeting. Additional potential problems could be encountered during transportation of impacted soils from the Site to the designated disposal facility.

Because the LHAAP-03 Site is small and entirely contained within the LHAAP-35A(58) boundary, all other monitoring and reporting requirements associated with groundwater and land use, including the five year reviews, will be met under LHAAP-35A(58).

The Preferred Alternative can change in response to public comments or new information.

Based on information currently available, the U.S. Army believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the alternatives with respect to the balancing and modifying criteria. The U.S. Army expects the Preferred Alternative to satisfy the following requirements of CERCLA Section 121(b):

- be protective of human health and the environment;
- comply with ARARs; and,
- be cost effective.

10.0 COMMUNITY PARTICIPATION

The U.S. Army, the USEPA, and the TCEQ provide information regarding LHAAP-03 through public meetings and the Administrative Record file for the facility. The public is encouraged to gain a more comprehensive understanding of the Site.

The public comment period for this Proposed Plan offers the public an opportunity to provide input to the LHAAP-03 remedial action planning process. The Proposed Plan is available in the Administrative Record (see "Dates to Remember" on page 1 of this Proposed Plan for location). The public comment period will begin on May 13, 2013 and end on June 12, 2013.

After the public has had an opportunity to review this Proposed Plan during the public comment period and the U.S. Army reviews the public comments received on it, the U.S. Army will publish the selected remedy for the LHAAP-03, the basis for its selection, the associated RAOs, and any contingency planning in a Decision Document (DD). The U.S. Army will also incorporate a Responsiveness Summary addressing public comments in the DD.

11.0 REFERENCES AND DOCUMENTS REVIEWED

AECOM, 2013. *Draft Final Remedial Investigation/Focused Feasibility Study For Lhaap-03 (Former Waste Collection Pad Near Building 722-P, Paint Shop) Longhorn Army Ammunition Plant Karnack, Texas.* February.

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Shaw, 2011a. *Final Remedial Design, LHAAP-35A(58), Shops Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Texas*, September.

Shaw, 2011b. *Draft Engineering Evaluation and Cost Analysis, LHAAP-03 (Former Waste Collection Pad Near Building 722-P, Paint Shop), Longhorn Army Ammunition Plant, Karnack, Texas.* September.

U.S. Army Environmental Hygiene Agency, 1987. *Hazardous Waste Study No. 37-26-1665-87, Hazardous Waste Minimization*. May.

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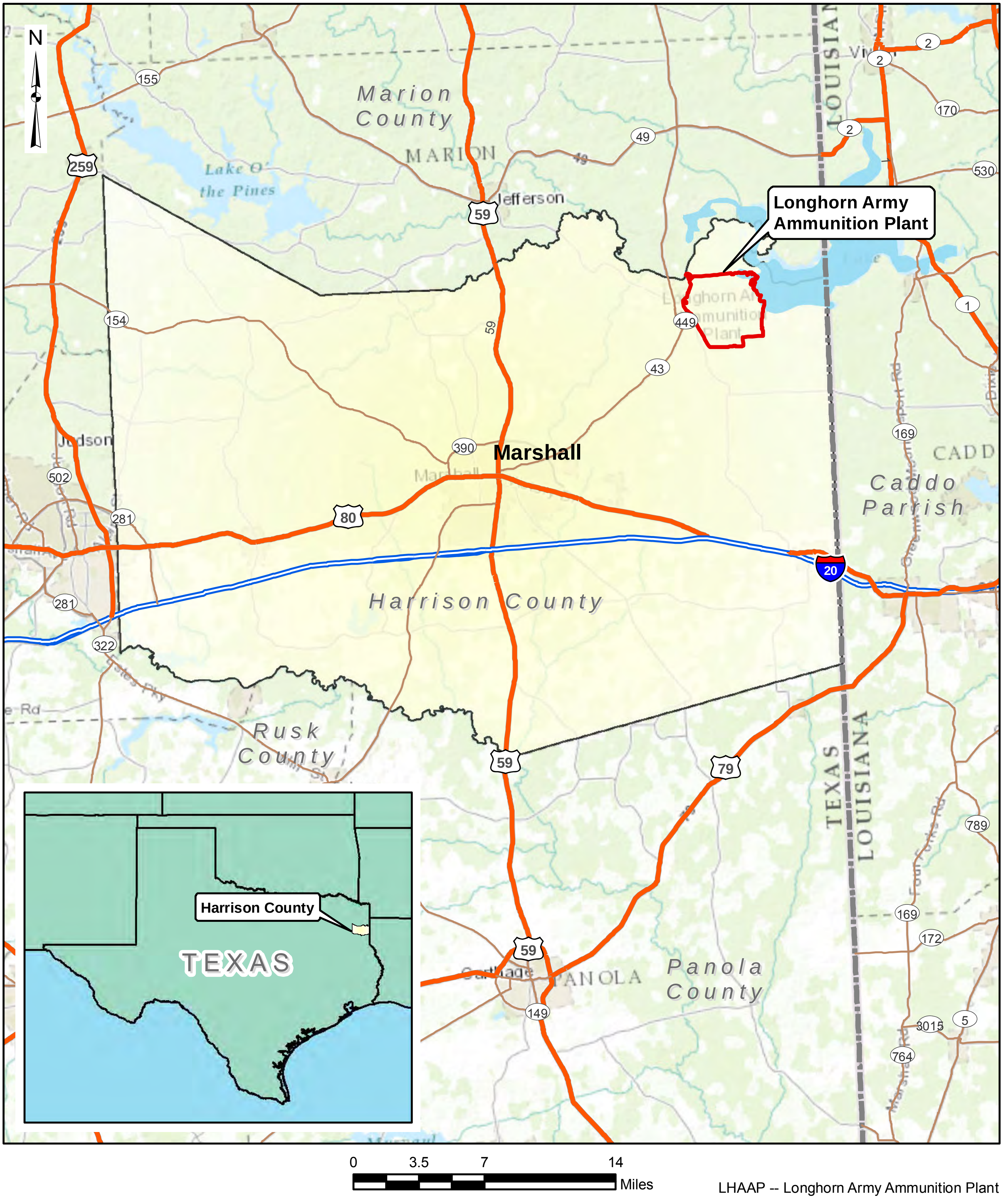


LHAAP -- Longhorn Army Ammunition Plant

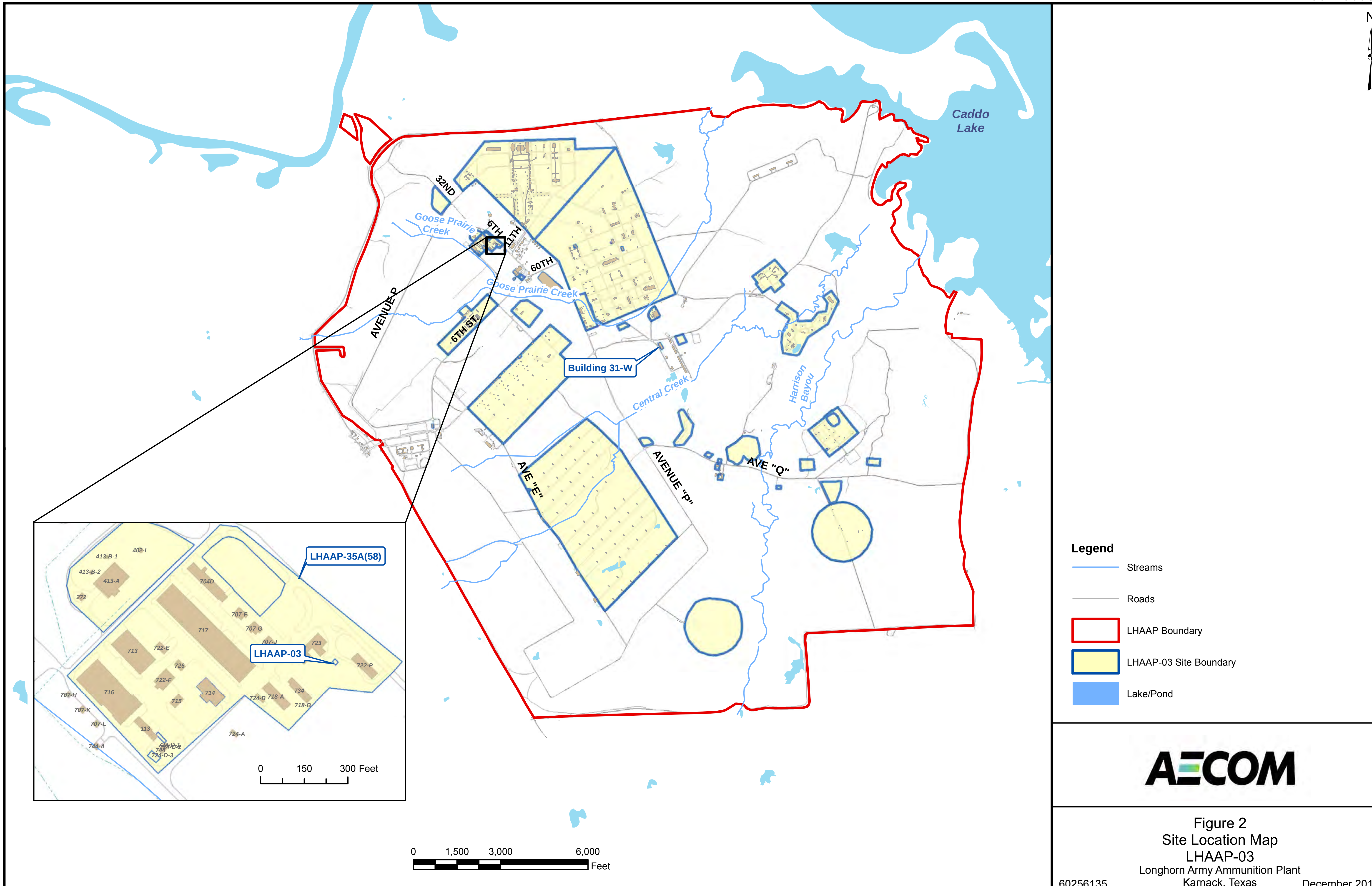
AECOM

Figure 1
LHAAP Location Map
LHAAP-03
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

December 2012

\\usgrn1vfp001\data\group\L:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-03\Figure 1-1 LHAAP-03 Site Location Map.mxd

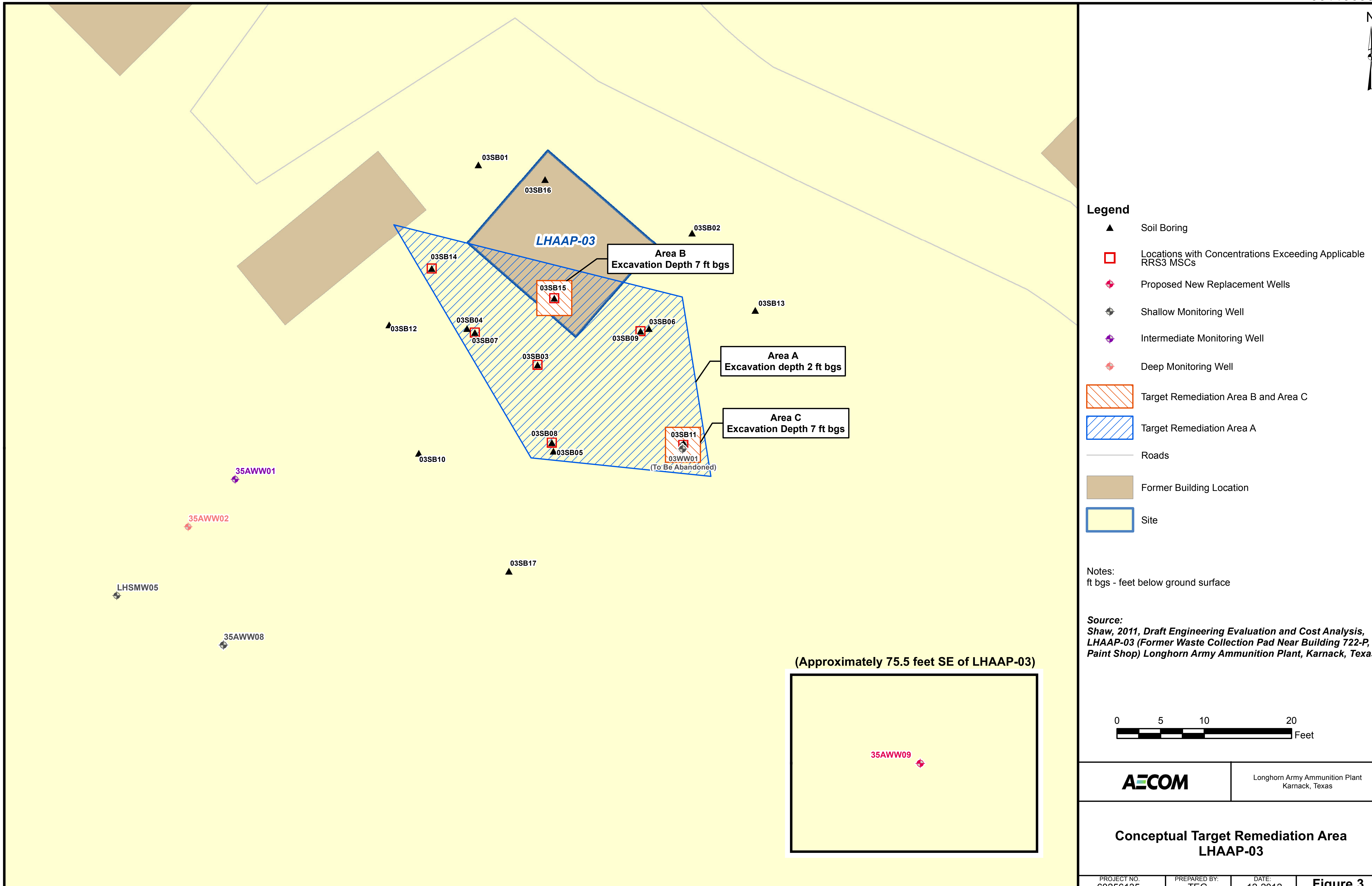


AECOM

Figure 2
Site Location Map
LHAAP-03
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

December 2012



03SB01
03SB16
LHAAP-03
03SB02
03SB14
Area B
Excavation Depth 7 ft bgs
03SB15
03SB13
03SB04
03SB06
03SB12
03SB07
03SB09
03SB03
Area A
Excavation depth 2 ft bgs
Area C
Excavation Depth 7 ft bgs
03SB08
03SB11
03SB05
03WW01
(To Be Abandoned)
03SB10
35AWW01
35AWW02
03SB17
LHSMW05
35AWW08
(Approximately 75.5 feet SE of LHAAP-03)
35AWW09
N
Legend
Soil Boring
Locations with Concentrations Exceeding Applicable RRS3 MSCs
Proposed New Replacement Wells
Shallow Monitoring Well
Intermediate Monitoring Well
Deep Monitoring Well
Target Remediation Area B and Area C
Target Remediation Area A
Roads
Former Building Location
Site
Notes:
ft bgs - feet below ground surface
Source:
Shaw, 2011, Draft Engineering Evaluation and Cost Analysis, LHAAP-03 (Former Waste Collection Pad Near Building 722-P, Paint Shop) Longhorn Army Ammunition Plant, Karnack, Texas.
0 5 10 20
Feet
AECOM
Longhorn Army Ammunition Plant
Karnack, Texas
Conceptual Target Remediation Area
LHAAP-03
PROJECT NO. 60256135
PREPARED BY: TEG
DATE: 12-2012
Figure 3

GLOSSARY OF TERMS

Specialized terms used in this Proposed Plan are defined below:

Administrative Record File: A file which is maintained and contains all information used to make a decision on the selection of a response action under CERCLA.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal and state environmental laws and regulations that must be complied with when undertaking a selected remedy. These requirements may vary among sites and alternatives.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA): A law that establishes a program to identify hazardous waste sites and procedures for cleaning up sites to be protective of human health and the environment, and evaluate damages to natural resources.

Decision Document (DD): A public document that identifies the selected remedy, the final RAOs, measures to achieve RAOs, the basis for the decision, remedial action performance expectations, and metrics to assess remedial progress. The DD is based on the information and technical analysis generated during the Remedial Investigation/Feasibility Study, consideration of ARARs, and consideration of public comments. All information used to make a final remedy decision must be documented in the Site Administrative Record.

Feasibility Study (FS): An investigation stage in the CERCLA clean-up process to identify the alternatives available to address contamination at a site, including an analysis of cost and how each alternative will protect human health and the environment

Five-year Review: A process that evaluates the protectiveness of the remedy and determines whether conditions remain protective of human health and the environment. CERCLA Section 121(c) and the National Contingency Plan at 40 CFR Section 300.430(f)(4)(ii) require that remedial actions that result in hazardous substances, pollutants, or contaminants remaining at a site above levels that allow for unlimited use and unrestricted exposure be reviewed every 5 years to ensure protection of human health and the environment.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): Also referred to as the National Contingency Plan, it is a plan required by CERCLA and codified at 40 CFR Section 300 that provides a framework for responding to releases or threats of release of hazardous substances and oil discharges.

Present Worth (PW) Analysis: A method to evaluate expenditures that occur over different time periods. By discounting all costs to a common base year, the costs for different remedial action alternatives can be compared. When calculating present worth costs for Superfund sites, capital as well as operation & maintenance costs are included.

Proposed Plan: A public participation requirement of CERCLA Section 117 in which the lead federal agency summarizes the preferred cleanup strategy, the rationale for the preference, the alternatives evaluated in the remedial investigation/feasibility study, and any ARAR waivers proposed for site cleanup. The Proposed Plan is issued to the public to solicit public review and comment on all alternatives under consideration.

Public Comment Period: A prescribed period during which the public may comment on the Proposed Plan.

Remedial Action: The means selected to achieve RAOs; also, the construction or implementation phase that follows the remedial design of the selected cleanup alternative at an NPL site.

Remedial Action Objective (RAO): The goals established for a remedy that ensure protection of human health and the environment.

Remedial Investigation (RI): An investigation stage in the CERCLA clean-up process in which the nature and extent of contamination (types of chemicals and how far they have travelled vertically and horizontally) is determined

Resource Conservation and Recovery Act (RCRA): RCRA, enacted in 1976, is the principal Federal law in the United States governing the disposal of solid waste and hazardous waste

Risk Assessment: An analysis of the potential adverse health effects (current and future) caused by hazardous substances. The assessment contributes to decisions regarding appropriate response alternatives.

ACRONYMS

ARARs	applicable or relevant and appropriate requirements
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	contaminant of concern
DD	Decision Document
FFA	Federal Facilities Agreement
HHRA	Human Health Risk Assessment
LHAAP	Longhorn Army Ammunition Plant
LUC	Land Use Control
MCL	Maximum Contaminant Level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
PW	present worth
RAO	Remedial Action Objective
RI/FFS	Remedial Investigation/Focused Feasibility Study
ROD	Record of Decision
SVOC	semi-volatile organic compounds
TCEQ	Texas Commission on Environmental Quality
U.S.	United States
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

LONGHORN ARMY AMMUNITION PLANT
Karnack, Texas

MONTHLY MANAGERS' MEETING

Minutes

DATE:	May 30, 2013
TIME:	2:00 p.m.
PLACE:	**LHAAP Army Trailer**

Welcome **RMZ**

Attendees:

Army BRAC:	Rose Zeiler (by phone)
EPA:	Rich Mayer (in person), Paul Torcoletti (by phone)
TCEQ:	April Palmie, Dale Vodak
USACE:	John Lambert, Aaron Williams
USFWS:	Paul Bruckwicki
AECOM:	Dave Wacker, Gretchen McDonnell
AEC:	Marilyn Plitnik (by phone)

Mr. Mayer arrived for the meeting at 2.25PM, however Mr. Torcoletti participated by phone until 2:35PM as EPA's representative.

Action Items

AECOM

- Submit proposed 2013 groundwater monitoring schedule for Army and agency review. **Pending.** Army has approved. AECOM will submit to agencies next week.
- Compile interim data submittal for the next MMM. **Pending.** AECOM has a large submittal covering data through mid-May that will be ready for submittal next week.
- Submit Field SOPs to agencies by April 15th. **Pending.** Revised schedule is to provide selected critical field SOPs to Army by June 13th, then to the agencies by June 19th. AECOM must address EPA comments on the Shaw IWWP and Shaw did not complete. Agencies feel an updated IWWP is warranted at this time. AECOM plans to develop a repackaged IWWP under AECOM's header, including all segments of the document, including revised SOPs. The repackaged IWWP is scheduled to be submitted to Army by mid-June and to agencies by mid-July, and will be added to the document tracker table. Upon receipt of email detailing agency concerns with LHAAP-37 RAWP RTCs, schedule a teleconference to resolve agency those concerns prior to finalizing the RTC document. **Complete.**

  Army feels the group is falling back into old habits with multiple comment response rounds on primary draft documents. Instead, the FFA parties must follow the FFA requirements which requires that informal dispute be invoked if further comment is made on the draft final. Going forward, during the 30-day comment resolution period after the 30-day agency review period, Army will give notice to the regulatory agencies of any nonconcurring responses and the parties will actively work through teleconference and email to resolve them. At the end of the 30-day period, based on the comment resolution efforts of the parties, and in accordance with the FFA, (Note added: "the Army shall give full consideration to all written comments" and "While the resulting draft final report shall be the responsibility of the Army, it shall be the product of consensus to the maximum extent possible"- FFA Section VIII.G.5), Army will issue a draft final primary document and an RTC table. If EPA or TCEQ has further comment, the regulatory agency will invoke informal dispute to engage further discussion.

- Include review and submittal milestone dates in the transmittal letter for the draft 5-Year Review Report. **Pending.**
- Review GWTP quarterly report for potential discrepancy between water elevation table and map. **Complete.** Comment will be addressed in a revision of the 3rd quarter report.
- Determine how effluent nutrient levels are reported (nitrate as N? Phosphorus as P?) and advise EPA. **Pending**.
- Add next GWTP quarterly report and ESD to Document and Issue Tracker table. **Complete.**
- Notify agencies two weeks in advance of 1,4-dioxane sampling. **Complete.**

Army

- Work with APG to arrange LHAAP-37 Bioplug presentation for July RAB meeting. Done. Suggest moving to September. **Complete.**
- Discuss internally if there is a more visual schedule than the FFA Excel-format schedule that can be provided to TCEQ. **Complete.** Army has a product that is ready for submittal to agencies.
- Combine decision documents for LHAAP-19 and LHAAP-56, -65, and -69 before returning them to TCEQ, for TCEQ staffing purposes. **Pending.**

EPA

- Provide to Army an email with any concerns/issues with LHAAP-37 RAWP RTCs. **Complete.**
- Send signed annual document control page of the Sitewide LUC Management Plan to Army. **Complete.** Army has hard copies of the LUC management plan that will be provided to the agencies after the meeting. Electronic copy will be transmitted to all parties by Mr. Williams.

TCEQ

- Provide to Army an email with any concerns/issues with LHAAP-37 RAWP RTCs. **Complete.**

AEC

Defense Environmental Restoration Program (DERP) PBR Update AECOM

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

Item 1 (LHAAP-04 ROD) - Discussed earlier in the meeting. Army will send redline RTC ROD and table and request for 20 days extension to submit the DF.

Item 2 (LHAAP-03 ROD) - Public comment period runs through June 12th. Caddo Lake Institute did not copy TCEQ and EPA on the comments from George Rice.

Items 3 & 4 (LHAAP-37 DF RAWP and LHAAP-50 DF RAWP) - Comments returned on the Draft Final were related to asking for more DPTs, which Army is willing to compromise on. An issue like MNA performance, however, cannot be compromised upon because Army is following the ROD. Per the ROD, the 5-year review was designed to be the place where remedy success or failure would be dealt with versus having contingency actions built into the remedy. Remedies for some other sites do have contingencies, but those RODs were developed during other circumstances when it was known that a PBC contractor would be doing the work. MNA monitoring for LHAAP-37 is further complicated by the bioplug demonstration because the bioplug aerobic treatment must be completed before the ROD remedy is implemented.

The FFA process must be followed for continued comment resolution after issuance of a draft final document, which, according to the FFA is informal dispute. Army noted that the draft final LHAAP-37 RAWP has been submitted by Army, and wondered whether EPA intended to invoke informal dispute. Army will send draft RTCs and a "redline RTC ROD" document to the regulators. Army will also request agency concurrence with single page replacement. Will follow same approach for LHAAP-50.

Item 5 (LHAAP-47 Draft ROD) - Agencies have sent comments. Army will review "do not concur" items. Preliminary RTCs need to be back to agencies by mid-month for a teleconference to resolve "do not concur" items.

Item 6 (LHAAP-58 Draft RAWP/TS) - Final data for the treatability study has been submitted to agencies. Ms. Palmie asked to be to review the new appendix of treatability study data prior to receiving it as part of the Draft Final RAWP. Army will provide the Appendix for regulatory review by June 14th. A teleconference to resolve "do not concur" comments (not including the treatability study data) must be scheduled if not performed along with the LHAAP-47 ROC RTC comment resolution call.

Item 7 (Sampling) - Compliance sampling is complete with exception of 18CPT16 and the four additional shallow Wilcox wells recently installed (18CPT MW-01SW, 18CPT MW-08SW, 18CPT MW-10SW, and 18CPT MW-12SW). 1.4-dioxane sampling has also been completed.

Items 8 & 9 (LHAAP-46 RACR and LHAAP-67 RACR) – These documents are currently being developed.

Item 10 (5-Year Review) – Army is working toward agency submittal. October 3rd signature date needs to be met. EPA needs 60 days so Army will attempt to get the document to the agencies by mid-July.

Item 11 (Monthly Managers' Meeting) – Draft meeting agenda and minutes from previous meeting will be provided by one week prior to the next meeting.

Items 12 – 14 (LHAAP-17 RD WP, LHAAP-29 PSI WP, LHAAP-16 RD WP) – placeholders for documents for dispute sites

Item 15 (July RAB) – placeholder

Item 16 (GWTP O&M / Air Monitoring) – The issue of nutrients from the GWTP was raised during the April Monthly Managers' Meeting, and discussion was continued. Ms. Palmie stated that Caddo Lake has nutrient limits because it's a drinking water supply, but the bayous and creeks do not because they are not drinking water supplies. Ms. Palmie stated that surface water quality standards would be the regulatory driver for managing these nutrients in the bayou, along with the fact that Harrison Bayou contributes to Caddo Lake which does have standards. TCEQ would like to run GWTP nutrient levels by their water quality standards group for evaluation. AECOM is currently examining the nutrient data. 18/24 (GWTP) has an ARAR for surface water protection so there is a regulatory basis for examining it. Ms. Palmie stated that Cypress Creek has high-visibility nutrient loading issues due to chicken farming, so she wants to be prepared for questions from the public related to Longhorn's potential nutrient contribution. Mr. Wacker explained that FBR feeding is being assessed as part of an optimization process and that feeding will likely be reduced over the next several months with an anticipated associated reduction in GWTP discharge nutrient concentrations.

Item 17 (Admin Record Update) - in progress

Items 18- 20 (BERA Addendum Work Plan, BERA Field Work, BERA Addendum) - Revised data gap memo has been submitted to the agencies. BERA Addendum Work Plan should be submitted to agencies next week.

Item 21(LHAAP-18/24 PSI WP and CSM) – For field work, a few new wells still need to be painted and then the five remaining new wells will be sampled.

Items 22 & 23 (Explanation of Significant Differences & GWTP Quarterly Report) - placeholders for upcoming documents

- Upcoming field work
  -Site 37, 50 and 58 field activities. DPT and well installation planned for all sites and excavation at LHAAP-50 tentatively set to start near the end of June.
- Monthly data - discussed earlier in meeting
- Quarterly reports - discussed earlier in meeting
- Groundwater Treatment Plant
  - Air Monitoring - Four weeks of data will be to Army for review tomorrow. No exceedances were noted.
  - INF Pond Topsoil and erosion control status – topsoil and seed being put installed this week
  - GWTP Longer-Term Plan – no update
  - Mr. Mayer requested information on historical pH data for MW-7

Other DERA Program Update **Army**

- Status of Supplemental BERA – discussed earlier in meeting
- Five Year Review Report Update – discussed earlier in meeting
- Sitewide LUC Management Plan – annual update – discussed earlier in meeting

MMRP Update **Army**

- Update – no update

Other Environmental Restoration **Army**

- CRP/CIP Update – Army is waiting for RAB input. Deadline for RAB comments is the next RAB meeting.
- Site 19 Decision Document update - discussed earlier. Army has one issue to resolve on LHAAP-19 and then the document will be submitted to TCEQ, combined with three other sites LHAAP-56, -65 and -69.
- Decision Documents for multiple sites – status update – will be adding to these to the Administrative Record
- Site 37 Bioplug - Ms. Zeiler advised that this presentation will be postponed until September/October RAB meeting.

- 1,4-dioxane sampling at Longhorn – complete. A second event will be planned to obtain information on seasonal variation.

Programmatic Issues **RMZ/RM/AP**

- Status of Dispute – no further update

USFWS Update **RMZ/PB**

- Environmental Restoration Issues with Transfer Schedule Impact – Ms. Zeiler has been in contact with Mr. Brad Sergeant with USFWS and is anticipating movement forward on several items by mid-July.
- USFWS Comments on Documents – no issues.

Schedule Next Managers' Meeting

Furloughs for Federal staff will consist of 11 Fridays between July and the end of fiscal year in September. All parties will need to plan in advance as there will be an impact for August document deadlines since the last day of month is a Friday.

Next Monthly Managers' Meeting scheduled for June 20, 2013 at 2PM, by teleconference. AECOM will send invite.

RAB still scheduled for July 16, 2013.

Adjourn

New Action Items

AECOM

- Submit Field Standard Operating Procedures to Agencies by June 19th.
- Submit repackaged IWWP to Army by mid-June and to agencies by mid-July.
- Add repackaged IWWP to the document tracker table.
- Provide historical MW-7 pH data to EPA.

Attachments

Validated Data Package (January 2013-May 2013)
Analysis of Harrison Bayou Water Quality for Surface Discharge Considerations

ACRONYM LIST

AEC	**United States Army Environmental Command**
AECOM	**AECOM Technology Services, Inc.**
AP	**April Palmie**
ARAR	**Applicable or Relevant Requirement**
APG	**Aberdeen Proving Grounds**
BERA	**Baseline Environmental Risk Assessment**
BRAC	**Base Realignment and Closure**
CRP/CIP	**Community Relations Plan / Community Involvement Plan**
CSM	**Conceptual Site Model**
DERA	**Defense Environmental Restoration Act**
DERP	**Defense Environmental Restoration Program**

DF	**Draft Final**
DPT	**Direct Push Technology**
EPA	**United States Environmental Protection Agency**
ESD	**Explanation of Significant Differences**
FBR	**Fluidized Bed Reactor**
FFA	**Federal Facility Agreement**
FS	**Feasibility Study**
GWTP	**Ground Water Treatment Plant**
INF	**Intermediate-Range Nuclear Forces**
IWWP	**Installation-Wide Work Plan**
LHAAP	**Longhorn Army Ammunition Plant**
LUC	**Land Use Controls**
MMM	**Monthly Managers' Meeting**
MMRP	**Military Munitions Response Program**
MNA	**Monitored Natural Attenuation**
PB	**Paul Bruckwicki**
PBR	**Performance-Based Remediation**
PP	**Proposed Plan**
PSI WP	**Post Screening Investigation Work Plan**
RAB	**Restoration Advisory Board**
RACR	**Remedial Action Completion Report**
RAWP	**Remedial Action Work Plan**
RM	**Rich Mayer**
RMZ	**Rose M. Zeiler**
ROD	**Record of Decision**
RTC	**Response to Comments**
TCEQ	**Texas Commission on Environmental Quality**
TS	**Treatability Study**
USACE	**United States Army Corps of Engineers**
USFWS	**United States Fish and Wildlife Service**

Location ID: Date Sampled:	Unit	LH18/24-Air-5039-Downwind 1/3/2013	LH18/24-Air-5039-GWTP 1/2/2013	LH18/24-Air-5039-Stripper 1/2/2013	LH18/24-Air-5039-StripperDUP 1/2/2013	LH18/24-Air-5042-Downwind 1/8/2013	LH18/24-Air-5042-GWTP 1/7/2013	LH18/24-Air-5042-Stripper 1/7/2013	LH18/24-Air-5042-Stripper-DUP 1/7/2013	LH18/24-Air-5042-Stripper-DUPDUP 1/7/2013
ID Location:		GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly
Volatile Organic Compounds (TO-15)										
1,1,1-TRICHLOROETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,1,2,2-TETRACHLOROETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,1,2-TRICHLOROETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,1-DICHLOROETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,1-DICHLOROETHENE	ug/m3	<0.66 U	<0.62 U	110	109	<0.64 U	<0.66 U	81	81	75.6
1,2,4-TRICHLOROBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,2,4-TRIMETHYLBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,2-DIBROMOETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,2-DICHLOROBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,2-DICHLOROETHANE	ug/m3	<0.66 U	<0.62 U	130	123	<0.64 U	<0.66 U	110	110	113
1,2-DICHLOROPROPANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,3,5-TRIMETHYLBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,3-Butadiene	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,3-DICHLOROBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,4-DICHLOROBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
1,4-DIOXANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
2-BUTANONE (MEK)	ug/m3	<6.6 U	<6.2 U	<1000 U	<1000 U	<6.4 U	<6.6 U	<770 U	<740 U	<740 U
2-HEXANONE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
2-PROPANOL	ug/m3	<6.6 U	<6.2 U	<1000 U	<1000 U	<6.4 U	<6.6 U	<770 U	<740 U	<740 U
4-ETHYLTOLUENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
4-METHYL-2-PENTANONE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
ACETONE	ug/m3	<6.6 U	<6.2 U	<1000 U	<1000 U	<6.4 U	<6.6 U	<770 U	<740 U	<740 U
ACETONITRILE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
ACROLEIN	ug/m3	<2.6 U	<2.5 U	<410 U	<410 U	<2.5 U	<2.6 U	<310 U	<300 U	<300 U
ACRYLONITRILE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
ALLYL CHLORIDE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
alpha-Pinene	ug/m3	1.9	<0.62 U	120	127	4.7	2	<77 U	<74 U	<74 U
BENZENE	ug/m3	0.71	0.7	<100 U	<100 U	0.83	0.98	<77 U	<74 U	<74 U
BENZYL CHLORIDE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
BROMODICHLOROMETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
BROMOFORM	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
BROMOMETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
CARBON DISULFIDE	ug/m3	<6.6 U	<6.2 U	<1000 U	<1000 U	<6.4 U	<6.6 U	<770 U	<740 U	<740 U
CARBON TETRACHLORIDE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
CHLOROBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
CHLOROETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
CHLOROFORM	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
CHLOROMETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
CIS-1,2-DICHLOROETHENE	ug/m3	<0.66 U	<0.62 U	9800	9490	<0.64 U	3.4	8200	8300	8200
CIS-1,3-DICHLOROPROPENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
CYCLOHEXANE	ug/m3	<1.3 U	<1.2 U	<210 U	<210 U	<1.3 U	<1.3 U	<150 U	<150 U	<150 U
DIBROMOCHLOROMETHANE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
DICHLORODIFLUOROMETHANE	ug/m3	2.6	2.6	<100 U	<100 U	2.7	2.6	<77 U	<74 U	<74 U
d-Limonene	ug/m3	<0.66 U	<0.62 U	<100 U	111	1.3	<0.66 U	<77 U	<74 U	<74 U
ETHANOL	ug/m3	<6.6 U	<6.2 U	1400	1430	59	<6.6 U	<770 U	<740 U	<740 U
ETHYL ACETATE	ug/m3	<1.3 U	2.1	<210 U	<210 U	<1.3 U	<1.3 U	<150 U	<150 U	<150 U
ETHYLBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
HEXACHLOROBUTADIENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
ISOPROPYLBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
m,p-Xylene	ug/m3	<1.3 U	<1.2 U	<210 U	<210 U	<1.3 U	<1.3 U	<150 U	<150 U	<150 U
METHYL METHACRYLATE	ug/m3	<1.3 U	<1.2 U	<210 U	<210 U	<1.3 U	<1.3 U	<150 U	<150 U	<150 U
METHYL TERT-BUTYL ETHER	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
METHYLENE CHLORIDE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
NAPHTHALENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
n-Butyl Acetate	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
N-Heptane	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
n-Hexane	ug/m3	0.73	0.76	<100 U	<100 U	0.83	1.1	<77 U	<74 U	<74 U
n-Nonane	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
n-Octane	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
N-PROPYLBENZENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
O-XYLENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
Propene	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
STYRENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
TETRACHLOROETHENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
TETRAHYDROFURAN	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
TOLUENE	ug/m3	1.3	1.6	200	210	0.65	0.68	<77 U	<74 U	<74 U
TRANS-1,2-DICHLOROETHENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
TRANS-1,3-DICHLOROPROPENE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U
TRICHLOROETHENE	ug/m3	<0.66 U	<0.62 U	18000	17400	<0.64 U	8.5	15000	15000	14900
TRICHLOROFLUOROMETHANE	ug/m3	1.3	1.3	<100 U	<100 U	1.3	1.2	<77 U	<74 U	<74 U
TRICHLOROTRIFLUOROETHANE	ug/m3	0.74	0.71	5500	5340	1.7	10	4000	3900	3840
VINYL ACETATE	ug/m3	<6.6 U	<6.2 U	<1000 U	<1000 U	<6.4 U	<6.6 U	<770 U	<740 U	<740 U
VINYL CHLORIDE	ug/m3	<0.66 U	<0.62 U	<100 U	<100 U	<0.64 U	<0.66 U	<77 U	<74 U	<74 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	LH18/24-AIR-5044-Downwind 1/15/2013	LH18/24-AIR-5044-GWTP 1/14/2013	LH18/24-AIR-5044-Stripper 1/14/2013	LH18/24-AIR-5044-StripperDUP 1/14/2013	LH18/24-Air-5046-Downwind 1/22/2013	LH18/24-Air-5046-GWTP 1/21/2013	LH18/24-Air-5046-Stripper 1/21/2013	LH18/24-Air-5046-StripperDUP 1/21/2013	LH18/24-Air-5048-Downwind 1/29/2013
ID Location:		GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly
Volatile Organic Compounds (TO-15)										
1,1,1-TRICHLOROETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,1,2,2-TETRACHLOROETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,1,2-TRICHLOROETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,1-DICHLOROETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,1-DICHLOROETHENE	ug/m3	<0.7 U	<0.61 U	100	96.8	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,2,4-TRICHLOROBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,2,4-TRIMETHYLBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	1.1
1,2-DIBROMO-3-CHLOROPROPANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,2-DIBROMOETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,2-DICHLOROBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,2-DICHLOROETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	86	83.7	<0.71 U
1,2-DICHLOROPROPANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,3,5-TRIMETHYLBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,3-Butadiene	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,3-DICHLOROBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,4-DICHLOROBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
1,4-DIOXANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
2-BUTANONE (MEK)	ug/m3	<7 U	<6.1 U	<940 U	<940 U	<7.6 U	<6.4 U	<830 U	<830 U	9.4
2-HEXANONE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
2-PROPANOL	ug/m3	<7 U	<6.1 U	<940 U	<940 U	<7.6 U	<6.4 U	<830 U	<830 U	<7.1 U
4-ETHYLTOLUENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
4-METHYL-2-PENTANONE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
ACETONE	ug/m3	<7 U	11	<940 U	<940 U	<7.6 U	<6.4 U	<830 U	<830 U	30
ACETONITRILE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
ACROLEIN	ug/m3	<2.8 U	<2.4 U	<370 U	<370 U	<3 U	<2.5 U	<330 U	<330 U	<2.8 U
ACRYLONITRILE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
ALLYL CHLORIDE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
alpha-Pinene	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	4.3	4.2	<83 U	<83 U	0.81
BENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	1.1	<83 U	<83 U	<0.71 U
BENZYL CHLORIDE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
BROMODICHLOROMETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
BROMOFORM	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
BROMOMETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
CARBON DISULFIDE	ug/m3	<7 U	<6.1 U	<940 U	<940 U	<7.6 U	<6.4 U	<830 U	<830 U	<7.1 U
CARBON TETRACHLORIDE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
CHLOROBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
CHLOROETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
CHLOROFORM	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
CHLOROMETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
CIS-1,2-DICHLOROETHENE	ug/m3	<0.7 U	1.1	7000	6960	<0.76 U	3.7	6500	6380	<0.71 U
CIS-1,3-DICHLOROPROPENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
CYCLOHEXANE	ug/m3	<1.4 U	<1.2 U	<190 U	<190 U	<1.5 U	<1.3 U	<170 U	<170 U	<1.4 U
DIBROMOCHLOROMETHANE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
DICHLORODIFLUOROMETHANE	ug/m3	2	2	<94 U	<94 U	2.1	2.4	<83 U	<83 U	2.5
d-Limonene	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	0.84	0.66	<83 U	<83 U	<0.71 U
ETHANOL	ug/m3	30	27	<940 U	<940 U	49	44	<830 U	<830 U	120
ETHYL ACETATE	ug/m3	<1.4 U	<1.2 U	<190 U	<190 U	<1.5 U	<1.3 U	<170 U	<170 U	2.2
ETHYLBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
HEXACHLOROBUTADIENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
ISOPROPYLBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
m,p-Xylene	ug/m3	<1.4 U	<1.2 U	<190 U	<190 U	<1.5 U	1.4	<170 U	<170 U	2.2
METHYL METHACRYLATE	ug/m3	<1.4 U	<1.2 U	<190 U	<190 U	<1.5 U	<1.3 U	<170 U	<170 U	<1.4 U
METHYL TERT-BUTYL ETHER	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
METHYLENE CHLORIDE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
NAPHTHALENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
n-Butyl Acetate	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	0.89	<83 U	<83 U	<0.71 U
N-Heptane	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	0.88	<83 U	<83 U	<0.71 U
n-Hexane	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	1.6	<83 U	<83 U	0.85
n-Nonane	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	1.8
n-Octane	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
N-PROPYLBENZENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
O-XYLENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	0.76
Propene	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	0.95
STYRENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	0.9
TETRACHLOROETHENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
TETRAHYDROFURAN	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	7.1
TOLUENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	0.98	<83 U	<83 U	4.5
TRANS-1,2-DICHLOROETHENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
TRANS-1,3-DICHLOROPROPENE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U
TRICHLOROETHENE	ug/m3	<0.7 U	3.1	15000	14900	<0.76 U	9.7	12000	12200	<0.71 U
TRICHLOROFLUOROMETHANE	ug/m3	1	1.1	<94 U	<94 U	1	1.1	<83 U	<83 U	1.4
TRICHLOROTRIFLUOROETHANE	ug/m3	<0.7 U	4.1	6200	6120	0.79	8.6	4400	4370	2.4
VINYL ACETATE	ug/m3	<7 U	<6.1 U	<940 U	<940 U	<7.6 U	<6.4 U	<830 U	<830 U	<7.1 U
VINYL CHLORIDE	ug/m3	<0.7 U	<0.61 U	<94 U	<94 U	<0.76 U	<0.64 U	<83 U	<83 U	<0.71 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	LH18/24-Air-5048-GWTP 1/28/2013	LH18/24-Air-5048-Stripper 1/28/2013	LH18/24-Air-5048-StripperDUP 1/28/2013	LH18/24-Air-5050-Downwind 2/5/2013	LH18/24-Air-5050-GWTP 2/4/2013	LH18/24-Air-5050-Stripper 2/4/2013	LH18/24-Air-5050-StripperDUP 2/4/2013	LH18/24-Air-5050-Stripper-DUP 2/4/2013	LH18/24-AIR-5053-Downwind 2/12/2013
ID Location:		GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly
Volatile Organic Compounds (TO-15)										
1,1,1-TRICHLOROETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,1,2,2-TETRACHLOROETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,1,2-TRICHLOROETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,1-DICHLOROETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,1-DICHLOROETHENE	ug/m3	<0.66 U	190	<170 U	<0.64 U	<0.65 U	140	149	<180 U	<0.76 U
1,2,4-TRICHLOROBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,2,4-TRIMETHYLBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,2-DIBROMOETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,2-DICHLOROBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,2-DICHLOROETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	150	153	<180 U	<0.76 U
1,2-DICHLOROPROPANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,3,5-TRIMETHYLBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,3-Butadiene	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,3-DICHLOROBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,4-DICHLOROBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
1,4-DIOXANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
2-BUTANONE (MEK)	ug/m3	<6.6 U	<1700 U	<1700 U	<6.4 U	<6.5 U	<1300 U	<1300 U	<1800 U	<7.6 U
2-HEXANONE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
2-PROPANOL	ug/m3	<6.6 U	<1700 U	<1700 U	<6.4 U	<6.5 U	<1300 U	<1300 U	<1800 U	<7.6 U
4-ETHYLTOLUENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
4-METHYL-2-PENTANONE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
ACETONE	ug/m3	8.4	<1700 U	<1700 U	<6.4 U	<6.5 U	<1300 U	<1300 U	<1800 U	<7.6 U
ACETONITRILE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
ACROLEIN	ug/m3	<2.6 U	<660 U	<660 U	<2.5 U	<2.6 U	<520 U	<520 U	<740 U	<3 U
ACRYLONITRILE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
ALLYL CHLORIDE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
alpha-Pinene	ug/m3	1.5	<170 U	<170 U	3	3.3	<130 U	<130 U	<180 U	<0.76 U
BENZENE	ug/m3	<0.66 U	<170 U	<170 U	1.8	1.8	<130 U	<130 U	<180 U	0.77
BENZYL CHLORIDE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
BROMODICHLOROMETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
BROMOFORM	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
BROMOMETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
CARBON DISULFIDE	ug/m3	<6.6 U	<1700 U	<1700 U	<6.4 U	<6.5 U	<1300 U	<1300 U	<1800 U	<7.6 U
CARBON TETRACHLORIDE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
CHLOROBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
CHLOROETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
CHLOROFORM	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
CHLOROMETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
CIS-1,2-DICHLOROETHENE	ug/m3	5.9	12000	9880	<0.64 U	6.7	11000	11500	11000	<0.76 U
CIS-1,3-DICHLOROPROPENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
CYCLOHEXANE	ug/m3	<1.3 U	<330 U	<330 U	<1.3 U	<1.3 U	<260 U	<260 U	<370 U	<1.5 U
DIBROMOCHLOROMETHANE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
DICHLORODIFLUOROMETHANE	ug/m3	2.4	<170 U	<170 U	2.5	2.3	<130 U	<130 U	<180 U	2.1
d-Limonene	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
ETHANOL	ug/m3	98	<1700 U	<1700 U	9.4	<6.5 U	<1300 U	<1300 U	<1800 U	62
ETHYL ACETATE	ug/m3	<1.3 U	<330 U	<330 U	<1.3 U	<1.3 U	<260 U	<260 U	<370 U	<1.5 U
ETHYLBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
HEXACHLOROBUTADIENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
ISOPROPYLBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
m,p-Xylene	ug/m3	1.6	<330 U	<330 U	<1.3 U	<1.3 U	<260 U	<260 U	<370 U	<1.5 U
METHYL METHACRYLATE	ug/m3	<1.3 U	<330 U	<330 U	<1.3 U	<1.3 U	<260 U	<260 U	<370 U	<1.5 U
METHYL TERT-BUTYL ETHER	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
METHYLENE CHLORIDE	ug/m3	13	26000	22000	<0.64 U	1.7	1600	1680	1600	<0.76 U
NAPHTHALENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
n-Butyl Acetate	ug/m3	0.75	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
N-Heptane	ug/m3	0.7	<170 U	<170 U	0.84	1.2	<130 U	<130 U	<180 U	<0.76 U
n-Hexane	ug/m3	0.85	<170 U	<170 U	1.9	2.5	<130 U	<130 U	<180 U	1.1
n-Nonane	ug/m3	0.71	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
n-Octane	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
N-PROPYLBENZENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
O-XYLENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
Propene	ug/m3	1	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
STYRENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
TETRACHLOROETHENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
TETRAHYDROFURAN	ug/m3	0.67	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	0.87
TOLUENE	ug/m3	3.6	<170 U	<170 U	1	1.3	<130 U	<130 U	<180 U	<0.76 U
TRANS-1,2-DICHLOROETHENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
TRANS-1,3-DICHLOROPROPENE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U
TRICHLOROETHENE	ug/m3	15	25000	20600	<0.64 U	19	23000	23800	22000	<0.76 U
TRICHLOROFLUOROMETHANE	ug/m3	1.2	<170 U	<170 U	1.3	1.2	<130 U	<130 U	<180 U	1.1
TRICHLOROTRIFLUOROETHANE	ug/m3	29	14000	11100	0.76	25	8900	9200	8600	<0.76 U
VINYL ACETATE	ug/m3	<6.6 U	<1700 U	<1700 U	<6.4 U	<6.5 U	<1300 U	<1300 U	<1800 U	<7.6 U
VINYL CHLORIDE	ug/m3	<0.66 U	<170 U	<170 U	<0.64 U	<0.65 U	<130 U	<130 U	<180 U	<0.76 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: / Date Sampled:	Unit	LH18/24-AIR-5053-GWTP 2/11/2013	LH18/24-AIR-5053-Stripper 2/11/2013	LH18/24-AIR-5053-StripperDUP 2/11/2013	LH18/24-Air-5055-Downwind 2/19/2013	LH18/24-AIR-5055-Downwind 2/28/2013	LH18/24-Air-5055-GWTP 2/18/2013	LH18/24-AIR-5055-GWTP 2/27/2013	LH18/24-AIR-5055-GWTPDUP 2/27/2013	LH18/24-Air-5055-Stripper 2/18/2013
ID Location:		GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly
Volatile Organic Compounds (TO-15)										
1,1,1-TRICHLOROETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,1,2,2-TETRACHLOROETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,1,2-TRICHLOROETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,1-DICHLOROETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,1-DICHLOROETHENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,2,4-TRICHLOROBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,2,4-TRIMETHYLBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,2-DIBROMOETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,2-DICHLOROBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,2-DICHLOROETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	130
1,2-DICHLOROPROPANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,3,5-TRIMETHYLBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,3-Butadiene	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,3-DICHLOROBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,4-DICHLOROBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
1,4-DIOXANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
2-BUTANONE (MEK)	ug/m3	<7.1 U	<1600 U	<1600 U	<6.8 U	<7.3 U	<6.6 U	<6.3 U	<6.3 U	<960 U
2-HEXANONE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
2-PROPANOL	ug/m3	<7.1 U	<1600 U	<1600 U	<6.8 U	<7.3 U	<6.6 U	<6.3 U	<6.3 U	<960 U
4-ETHYLTOLUENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
4-METHYL-2-PENTANONE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
ACETONE	ug/m3	<7.1 U	<1600 U	<1600 U	<6.8 U	<7.3 U	<6.6 U	<6.3 U	<6.3 U	<960 U
ACETONITRILE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
ACROLEIN	ug/m3	<2.8 U	<620 U	<620 U	<2.7 U	<2.9 U	<2.6 U	<2.5 U	<2.5 U	<380 U
ACRYLONITRILE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
ALLYL CHLORIDE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
alpha-Pinene	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	1.4	<0.66 U	1.2	1.17	<96 U
BENZENE	ug/m3	0.97	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	1.3	1.29	<96 U
BENZYL CHLORIDE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
BROMODICHLOROMETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
BROMOFORM	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	1.4	1.44	<96 U
BROMOMETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
CARBON DISULFIDE	ug/m3	<7.1 U	<1600 U	<1600 U	<6.8 U	<7.3 U	<6.6 U	<6.3 U	<6.3 U	<960 U
CARBON TETRACHLORIDE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
CHLOROBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
CHLOROETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
CHLOROFORM	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
CHLOROMETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
CIS-1,2-DICHLOROETHENE	ug/m3	8.1	14000	13200	<0.68 U	<0.73 U	1.3	<0.63 U	<0.63 U	8500
CIS-1,3-DICHLOROPROPENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
CYCLOHEXANE	ug/m3	<1.4 U	<310 U	<310 U	<1.4 U	<1.5 U	<1.3 U	<1.3 U	<1.3 U	<190 U
DIBROMOCHLOROMETHANE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
DICHLORODIFLUOROMETHANE	ug/m3	2.1	<160 U	<160 U	1.8	2.5	1.8	2.7	2.74	<96 U
d-Limonene	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	1.9	<0.66 U	0.71	0.706	<96 U
ETHANOL	ug/m3	33	<1600 U	<1600 U	130	28	20	28	27.2	<960 U
ETHYL ACETATE	ug/m3	<1.4 U	<310 U	<310 U	1.4	<1.5 U	<1.3 U	<1.3 U	<1.3 U	<190 U
ETHYLBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
HEXACHLOROBUTADIENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
ISOPROPYLBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
m,p-Xylene	ug/m3	<1.4 U	<310 U	<310 U	<1.4 U	<1.5 U	<1.3 U	<1.3 U	<1.3 U	<190 U
METHYL METHACRYLATE	ug/m3	<1.4 U	<310 U	<310 U	<1.4 U	<1.5 U	<1.3 U	<1.3 U	<1.3 U	<190 U
METHYL TERT-BUTYL ETHER	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
METHYLENE CHLORIDE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	97
NAPHTHALENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
n-Butyl Acetate	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
N-Heptane	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	0.66	0.671	<96 U
n-Hexane	ug/m3	1.2	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	1.6	1.6	<96 U
n-Nonane	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
n-Octane	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
N-PROPYLBENZENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
O-XYLENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
Propene	ug/m3	<0.71 U	<160 U	<160 U	2	<0.73 U	<0.66 U	2	1.79	<96 U
STYRENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
TETRACHLOROETHENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
TETRAHYDROFURAN	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
TOLUENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	1.5	1.54	<96 U
TRANS-1,2-DICHLOROETHENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
TRANS-1,3-DICHLOROPROPENE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U
TRICHLOROETHENE	ug/m3	23	28000	27800	<0.68 U	<0.73 U	4.1	0.75	0.741	16000
TRICHLOROFLUOROMETHANE	ug/m3	1.1	<160 U	<160 U	0.92	1.2	0.96	1.3	1.33	<96 U
TRICHLOROTRIFLUOROETHANE	ug/m3	21	9100	9000	4.6	0.96	5.6	1.2	1.25	6000
VINYL ACETATE	ug/m3	<7.1 U	<1600 U	<1600 U	<6.8 U	<7.3 U	<6.6 U	<6.3 U	<6.3 U	<960 U
VINYL CHLORIDE	ug/m3	<0.71 U	<160 U	<160 U	<0.68 U	<0.73 U	<0.66 U	<0.63 U	<0.63 U	<96 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	LH18/24-AIR-5055-Stripper 2/27/2013	LH18/24-Air-5055-StripperDUP 2/18/2013	LH18/24-Air-5057-Downwind 3/12/2013	LH18/24-Air-5057-GWTP 3/11/2013	LH18/24-Air-5057-Stripper 3/11/2013	LH18/24-Air-5057-StripperDUP 3/11/2013	LH18/24-Air-5057-Stripper-Dup 3/11/2013	LH18/24-Air-5060-Downwind 3/19/2013	LH18/24-Air-5060-DownwindDUP 3/19/2013
ID Location:		GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly
Volatile Organic Compounds (TO-15)										
1,1,1-TRICHLOROETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,1,2,2-TETRACHLOROETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,1,2-TRICHLOROETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,1-DICHLOROETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,1-DICHLOROETHENE	ug/m3	140	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,2,4-TRICHLOROBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,2,4-TRIMETHYLBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	1.1	1.12
1,2-DIBROMO-3-CHLOROPROPANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,2-DIBROMOETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,2-DICHLOROBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,2-DICHLOROETHANE	ug/m3	190	128	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,2-DICHLOROPROPANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,3,5-TRIMETHYLBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,3-Butadiene	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,3-DICHLOROBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,4-DICHLOROBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
1,4-DIOXANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
2-BUTANONE (MEK)	ug/m3	<1100 U	<960 U	<6.3 U	<6.4 U	<2100 U	<2100 U	<2200 U	<6.2 U	<6.2 U
2-HEXANONE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
2-PROPANOL	ug/m3	<1100 U	<960 U	<6.3 U	<6.4 U	<2100 U	<2100 U	<2200 U	<6.2 U	<6.2 U
4-ETHYLTOLUENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
4-METHYL-2-PENTANONE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
ACETONE	ug/m3	<1100 U	<960 U	<6.3 U	<6.4 U	<2100 U	<2100 U	<2200 U	8.9	8.87
ACETONITRILE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
ACROLEIN	ug/m3	<430 U	<380 U	<2.5 U	<2.5 U	<840 U	<840 U	<860 U	<2.5 U	<2.5 U
ACRYLONITRILE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
ALLYL CHLORIDE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
alpha-Pinene	ug/m3	<110 U	<96 U	1	<0.64 U	<210 U	<210 U	<220 U	1.4	1.46
BENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	1	1.05
BENZYL CHLORIDE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
BROMODICHLOROMETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
BROMOFORM	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
BROMOMETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
CARBON DISULFIDE	ug/m3	<1100 U	<960 U	<6.3 U	<6.4 U	<2100 U	<2100 U	<2200 U	<6.2 U	<6.2 U
CARBON TETRACHLORIDE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
CHLOROBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
CHLOROETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
CHLOROFORM	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
CHLOROMETHANE	ug/m3	<110 U	<96 U	0.74	0.68	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
CIS-1,2-DICHLOROETHENE	ug/m3	13000	8720	<0.63 U	<0.64 U	15000	14600	15000	<0.62 U	<0.62 U
CIS-1,3-DICHLOROPROPENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
CYCLOHEXANE	ug/m3	<220 U	<190 U	<1.3 U	<1.3 U	<420 U	<420 U	<430 U	<1.2 U	<1.2 U
DIBROMOCHLOROMETHANE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
DICHLORODIFLUOROMETHANE	ug/m3	<110 U	<96 U	2.2	2.2	<210 U	<210 U	<220 U	2.5	2.53
d-Limonene	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
ETHANOL	ug/m3	<1100 U	<960 U	7	<6.4 U	<2100 U	<2100 U	<2200 U	65	65.9
ETHYL ACETATE	ug/m3	<220 U	<190 U	<1.3 U	<1.3 U	<420 U	<420 U	<430 U	<1.2 U	<1.2 U
ETHYLBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
HEXACHLOROBUTADIENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
ISOPROPYLBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
m,p-Xylene	ug/m3	<220 U	<190 U	<1.3 U	<1.3 U	<420 U	<420 U	<430 U	1.7	1.79
METHYL METHACRYLATE	ug/m3	<220 U	<190 U	<1.3 U	<1.3 U	<420 U	<420 U	<430 U	<1.2 U	<1.2 U
METHYL TERT-BUTYL ETHER	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
METHYLENE CHLORIDE	ug/m3	490	98.8	<0.63 U	<0.64 U	370	370	360	<0.62 U	<0.62 U
NAPHTHALENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
n-Butyl Acetate	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
N-Heptane	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
n-Hexane	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	0.87	0.877
n-Nonane	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
n-Octane	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
N-PROPYLBENZENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
O-XYLENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	0.65	0.675
Propene	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	0.87	0.914
STYRENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
TETRACHLOROETHENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
TETRAHYDROFURAN	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
TOLUENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	1.5	1.5
TRANS-1,2-DICHLOROETHENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
TRANS-1,3-DICHLOROPROPENE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U
TRICHLOROETHENE	ug/m3	28000	16600	<0.63 U	<0.64 U	34000	34300	34000	<0.62 U	<0.62 U
TRICHLOROFLUOROMETHANE	ug/m3	<110 U	<96 U	1.2	1.1	<210 U	<210 U	<220 U	1.2	1.23
TRICHLOROTRIFLUOROETHANE	ug/m3	9000	6110	0.65	<0.64 U	11000	11300	11000	0.75	0.787
VINYL ACETATE	ug/m3	<1100 U	<960 U	<6.3 U	<6.4 U	<2100 U	<2100 U	<2200 U	<6.2 U	<6.2 U
VINYL CHLORIDE	ug/m3	<110 U	<96 U	<0.63 U	<0.64 U	<210 U	<210 U	<220 U	<0.62 U	<0.62 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	LH18/24-Air-5060-GWTP 3/18/2013	LH18/24-Air-5060-STRIPPER 3/18/2013	LH18/24-Air-5067-Downwind 4/9/2013	LH18/24-Air-5067-GWTP 4/8/2013	LH18/24-Air-5067-GWTPDUP 4/8/2013	LH18/24-Air-5067-Stripper 4/8/2013	LH18/24-Air-5069-Downwind 4/16/2013	LH18/24-Air-5069-GWTP 4/15/2013	LH18/24-Air-5069-Stripper 4/15/2013	LH18/24-Air-5069-StripperDUP 4/15/2013
ID Location:		GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly
Volatile Organic Compounds (TO-15)											
1,1,1-TRICHLOROETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,1,2,2-TETRACHLOROETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,1,2-TRICHLOROETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,1-DICHLOROETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,1-DICHLOROETHENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2,4-TRICHLOROBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2,4-TRIMETHYLBENZENE	ug/m3	<0.68 U	<220 U	0.81	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2-DIBROMOETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2-DICHLOROBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2-DICHLOROETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,2-DICHLOROPROPANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,3,5-TRIMETHYLBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,3-Butadiene	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,3-DICHLOROBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,4-DICHLOROBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
1,4-DIOXANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
2-BUTANONE (MEK)	ug/m3	<6.8 U	<2200 U	6.8	<6.9 U	<6.9 U	<1900 U	<6.8 U	<7 U	<2400 U	<2400 U
2-HEXANONE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
2-PROPANOL	ug/m3	<6.8 U	<2200 U	<6.6 U	<6.9 U	<6.9 U	<1900 U	<6.8 U	<7 U	<2400 U	<2400 U
4-ETHYLTOLUENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
4-METHYL-2-PENTANONE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
ACETONE	ug/m3	8.6	<2200 U	16	<6.9 U	<6.9 U	<1900 U	18	9.4	<2400 U	<2400 U
ACETONITRILE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	0.78	<0.7 U	<240 U	<240 U
ACROLEIN	ug/m3	<2.7 U	<880 U	<2.6 U	<2.8 U	<2.8 U	<770 U	<2.7 U	<2.8 U	<970 U	<970 U
ACRYLONITRILE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
ALLYL CHLORIDE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
alpha-Pinene	ug/m3	<0.68 U	<220 U	0.76	0.83	0.846	<190 U	2.4	<0.7 U	<240 U	<240 U
BENZENE	ug/m3	0.74	<220 U	1.4	<0.69 U	<0.69 U	<190 U	0.75	0.79	<240 U	<240 U
BENZYL CHLORIDE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
BROMODICHLOROMETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
BROMOFORM	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
BROMOMETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
CARBON DISULFIDE	ug/m3	<6.8 U	<2200 U	<6.6 U	<6.9 U	<6.9 U	<1900 U	<6.8 U	<7 U	<2400 U	<2400 U
CARBON TETRACHLORIDE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
CHLOROBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
CHLOROETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
CHLOROFORM	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
CHLOROMETHANE	ug/m3	<0.68 U	<220 U	0.67	<0.69 U	<0.69 U	<190 U	0.85	0.76	<240 U	<240 U
CIS-1,2-DICHLOROETHENE	ug/m3	0.76	19000	<0.66 U	5	5.02	15000	<0.68 U	5.4	21000	21500
CIS-1,3-DICHLOROPROPENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
CYCLOHEXANE	ug/m3	<1.4 U	<440 U	<1.3 U	<1.4 U	<1.4 U	<390 U	<1.4 U	<1.4 U	<480 U	<480 U
DIBROMOCHLOROMETHANE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
DICHLORODIFLUOROMETHANE	ug/m3	2.5	<220 U	2.3	2.1	2.07	<190 U	2.5	2.4	<240 U	<240 U
d-Limonene	ug/m3	1.1	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	0.92	<0.7 U	<240 U	<240 U
ETHANOL	ug/m3	55	<2200 U	120	11	11.1	<1900 U	100	<7 U	<2400 U	<2400 U
ETHYL ACETATE	ug/m3	<1.4 U	<440 U	<1.3 U	<1.4 U	<1.4 U	<390 U	<1.4 U	<1.4 U	<480 U	<480 U
ETHYLBENZENE	ug/m3	<0.68 U	<220 U	1.6	<0.69 U	<0.69 U	<190 U	0.94	<0.7 U	<240 U	<240 U
HEXACHLOROBUTADIENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
ISOPROPYLBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
m,p-Xylene	ug/m3	<1.4 U	<440 U	5.5	1.8	1.77	<390 U	3.3	<1.4 U	<480 U	<480 U
METHYL METHACRYLATE	ug/m3	<1.4 U	<440 U	<1.3 U	<1.4 U	<1.4 U	<390 U	<1.4 U	<1.4 U	<480 U	<480 U
METHYL TERT-BUTYL ETHER	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
METHYLENE CHLORIDE	ug/m3	<0.68 U	580	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
NAPHTHALENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
n-Butyl Acetate	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
N-Heptane	ug/m3	<0.68 U	<220 U	2.1	<0.69 U	<0.69 U	<190 U	0.76	<0.7 U	<240 U	<240 U
n-Hexane	ug/m3	0.81	<220 U	7.5	0.89	0.941	<190 U	1.8	0.73	<240 U	<240 U
n-Nonane	ug/m3	0.77	<220 U	1.4	<0.69 U	<0.69 U	<190 U	1.4	<0.7 U	<240 U	<240 U
n-Octane	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	0.68	<0.7 U	<240 U	<240 U
N-PROPYLBENZENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
O-XYLENE	ug/m3	<0.68 U	<220 U	1.5	<0.69 U	<0.69 U	<190 U	0.92	<0.7 U	<240 U	<240 U
Propene	ug/m3	<0.68 U	<220 U	0.87	<0.69 U	<0.69 U	<190 U	0.81	<0.7 U	<240 U	<240 U
STYRENE	ug/m3	<0.68 U	<220 U	1.2	<0.69 U	<0.69 U	<190 U	1.2	<0.7 U	<240 U	<240 U
TETRACHLOROETHENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
TETRAHYDROFURAN	ug/m3	1.8	<220 U	7.3	0.73	0.798	<190 U	6.4	1	<240 U	<240 U
TOLUENE	ug/m3	0.7	<220 U	7.8	1.6	1.57	<190 U	3.8	1.1	<240 U	<240 U
TRANS-1,2-DICHLOROETHENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
TRANS-1,3-DICHLOROPROPENE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U
TRICHLOROETHENE	ug/m3	2.1	35000	0.85	17	16.8	31000	<0.68 U	16	40000	40600
TRICHLOROFLUOROMETHANE	ug/m3	1.2	<220 U	1.5	1.1	1.06	<190 U	1.4	1.1	<240 U	<240 U
TRICHLOROTRIFLUOROETHANE	ug/m3	2.4	9800	3.7	31	31.1	14000	<0.68 U	29	16000	16300
VINYL ACETATE	ug/m3	<6.8 U	<2200 U	<6.6 U	<6.9 U	<6.9 U	<1900 U	<6.8 U	<7 U	<2400 U	<2400 U
VINYL CHLORIDE	ug/m3	<0.68 U	<220 U	<0.66 U	<0.69 U	<0.69 U	<190 U	<0.68 U	<0.7 U	<240 U	<240 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

00119115

Location ID: Date Sampled:	Unit	LH18/24-Air-6062-Downwind 3/26/2013	LH18/24-Air-6062-GWTP 3/25/2013	LH18/24-Air-6062-STRIPPER 3/25/2013	LH18/24-Air-6062-STRIPPERDUP 3/25/2013	LH18/24-Air-6064-Downwind 4/3/2013	LH18/24-Air-6064-GWTP 4/2/2013	LH18/24-Air-6064-Stripper 4/2/2013	LH18/24-Air-6064-Stripper-DUP 4/2/2013	LH18/24-Air-6064-Stripper-DUPDUP 4/2/2013
ID Location:		GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Sample location is dependent on wind direction and is collected downwind at designated locations at the Army-owned property boundary Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly	GWTP – Grab samples, collected from the air stripper line Sampled Weekly
Volatile Organic Compounds (TO-15)										
1,1,1-TRICHLOROETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,1,2,2-TETRACHLOROETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,1,2-TRICHLOROETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,1-DICHLOROETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,1-DICHLOROETHENE	ug/m3	<0.73 U	<0.66 U	140	142	<0.82 U	<0.68 U	<110 U	110	108
1,2,4-TRICHLOROBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,2,4-TRIMETHYLBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1.1	<110 U	<110 U	<110 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,2-DIBROMOETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,2-DICHLOROBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,2-DICHLOROETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,2-DICHLOROPROPANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,3,5-TRIMETHYLBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,3-Butadiene	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,3-DICHLOROBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,4-DICHLOROBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
1,4-DIOXANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
2-BUTANONE (MEK)	ug/m3	<7.3 U	<6.6 U	<1300 U	<1300 U	<8.2 U	<6.8 U	<1100 U	<1100 U	<1100 U
2-HEXANONE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
2-PROPANOL	ug/m3	<7.3 U	<6.6 U	<1300 U	<1300 U	<8.2 U	<6.8 U	<1100 U	<1100 U	<1100 U
4-ETHYLTOLUENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
4-METHYL-2-PENTANONE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
ACETONE	ug/m3	<7.3 U	<6.6 U	<1300 U	<1300 U	11	14	<1100 U	<1100 U	<1100 U
ACETONITRILE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
ACROLEIN	ug/m3	<2.9 U	<2.6 U	<500 U	<500 U	<3.3 U	<2.7 U	<430 U	<430 U	<430 U
ACRYLONITRILE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
ALLYL CHLORIDE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
alpha-Pinene	ug/m3	0.86	<0.66 U	<130 U	<130 U	0.97	1.3	<110 U	<110 U	<110 U
BENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1	<110 U	<110 U	<110 U
BENZYL CHLORIDE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
BROMODICHLOROMETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
BROMOFORM	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
BROMOMETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
CARBON DISULFIDE	ug/m3	<7.3 U	<6.6 U	<1300 U	<1300 U	<8.2 U	<6.8 U	<1100 U	<1100 U	<1100 U
CARBON TETRACHLORIDE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
CHLOROBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
CHLOROETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
CHLOROFORM	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
CHLOROMETHANE	ug/m3	<0.73 U	0.69	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
CIS-1,2-DICHLOROETHENE	ug/m3	<0.73 U	<0.66 U	13000	12700	<0.82 U	7.7	9100	9200	9180
CIS-1,3-DICHLOROPROPENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
CYCLOHEXANE	ug/m3	<1.5 U	<1.3 U	<250 U	<250 U	<1.6 U	<1.4 U	<220 U	<220 U	<220 U
DIBROMOCHLOROMETHANE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
DICHLORODIFLUOROMETHANE	ug/m3	2.2	2.2	<130 U	<130 U	2.3	2	<110 U	<110 U	<110 U
d-Limonene	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	0.9	<110 U	<110 U	<110 U
ETHANOL	ug/m3	17	9.6	<1300 U	<1300 U	19	95	<1100 U	<1100 U	<1100 U
ETHYL ACETATE	ug/m3	<1.5 U	<1.3 U	<250 U	<250 U	<1.6 U	<1.4 U	<220 U	<220 U	<220 U
ETHYLBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1.1	<110 U	<110 U	<110 U
HEXACHLOROBUTADIENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
ISOPROPYLBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
m,p-Xylene	ug/m3	<1.5 U	<1.3 U	<250 U	<250 U	<1.6 U	4.1	<220 U	<220 U	<220 U
METHYL METHACRYLATE	ug/m3	<1.5 U	<1.3 U	<250 U	<250 U	<1.6 U	<1.4 U	<220 U	<220 U	<220 U
METHYL TERT-BUTYL ETHER	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
METHYLENE CHLORIDE	ug/m3	<0.73 U	<0.66 U	800	815	<0.82 U	0.82	420	420	416
NAPHTHALENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
n-Butyl Acetate	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
N-Heptane	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1.1	<110 U	<110 U	<110 U
n-Hexane	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1.9	<110 U	<110 U	<110 U
n-Nonane	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1	<110 U	<110 U	<110 U
n-Octane	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
N-PROPYLBENZENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
O-XYLENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1.4	<110 U	<110 U	<110 U
Propene	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1.2	<110 U	<110 U	<110 U
STYRENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
TETRACHLOROETHENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
TETRAHYDROFURAN	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	1.4	<110 U	<110 U	<110 U
TOLUENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	0.88	4.4	<110 U	<110 U	<110 U
TRANS-1,2-DICHLOROETHENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
TRANS-1,3-DICHLOROPROPENE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U
TRICHLOROETHENE	ug/m3	<0.73 U	<0.66 U	26000	25900	<0.82 U	21	18000	18000	18000
TRICHLOROFLUOROMETHANE	ug/m3	1.1	1.1	<130 U	<130 U	1.2	1.1	<110 U	<110 U	<110 U
TRICHLOROTRIFLUOROETHANE	ug/m3	1.6	0.68	11000	11400	<0.82 U	29	8200	8300	8240
VINYL ACETATE	ug/m3	<7.3 U	<6.6 U	<1300 U	<1300 U	<8.2 U	<6.8 U	<1100 U	<1100 U	<1100 U
VINYL CHLORIDE	ug/m3	<0.73 U	<0.66 U	<130 U	<130 U	<0.82 U	<0.68 U	<110 U	<110 U	<110 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Units	MCL	LH18/24-SP140-7051-GRAB 2/4/2013 Spigot	LH18/24-SP140-7058-GRAB 3/11/2013 Spigot	LH18/24-SP140-7065-Grab 4/2/2013 Spigot	LH18/24-SP140-7065-GRAB 4/2/2013 Spigot	LH18/24-SP650-6041-COMP 1/3/2013 Holding Jar/Spigot	LH18/24-SP650-6041-GRAB 1/3/2013 Spigot	LH18/24-SP650-6043-GRAB 1/7/2013 Spigot	LH18/24-SP650-6045-COMP 1/14/2013 Holding Jar/Spigot	LH18/24-SP650-6045-GRAB 1/14/2013 Spigot	LH18/24-SP650-6047 GRAB 1/21/2013 Spigot	LH18/24-SP650-6049-COMP 1/28/2013 Holding Jar/Spigot
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	GWTP – Collected from a spigot on the discharge of influent TK-140 Sampled Monthly	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 a spigot on the discharge of effluent TK-650 Sampled Weekly	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 Monthly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from holding jar which collects the discharge from a spigot on effluent TK-650 every couple of hours Sampled Biweekly
Oil and Grease (1664A)													
OIL & GREASE	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ammonia (350.1)													
AMMONIA AS N	mg/L		NA	NA	NA	NA	NA	NA	4.41	NA	NA	1.92	NA
Ortho-Phosphate (365.2)													
ORTHO-PHOSPHATE	mg/L		NA	NA	NA	NA	NA	NA	1.24	NA	NA	0.33	NA
Chemical Oxygen Demand (410.4)													
CHEMICAL OXYGEN DEMAND	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TO	mg/L		NA	NA	NA	NA	NA	NA	5.05	NA	NA	5.43	NA
Metals (6010C and 6020A)													
ALUMINUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
IRON	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	mg/L	0.05	NA	NA	NA	NA	<0.01 U	<0.01 U	NA	<0.01 U	<0.01 U	NA	<0.01 U
ANTIMONY	mg/L	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/L	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
COBALT	mg/L	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/L		NA	NA	NA	NA	<0.001 U	<0.001 U	NA	<0.001 U	<0.001 U	NA	<0.001 U
MANGANESE	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NICKEL	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/L	0.002	NA	NA	NA	NA	<0.001 U	<0.001 U	NA	<0.001 U	<0.001 U	NA	<0.001 U
THALLIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)													
PERCHLORATE	ug/L		13600	18000	1600	NA	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Hexavalent Chromium (7196A)													
HEXAVALENT CHROMIUM	mg/L		NA	NA	NA	NA	<0.01 U	<0.01 U	NA	<0.01 U	<0.01 U	NA	<0.01 UJ
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,1,1-TRICHLOROETHANE	ug/L	200	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,1,2,2-TETRACHLOROETHANE	ug/L		<10 U	<8 U	NA	<20 U	NA	<0.4 U	NA	NA	<0.4 U	NA	NA
1,1,2-TRICHLOROETHANE	ug/L	5	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,1-DICHLOROETHANE	ug/L		<6.25 U	7.45	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
1,1-DICHLOROETHENE	ug/L	7	43.1 J	54	NA	60.3	NA	<1 U	NA	NA	<1 U	NA	NA
1,1-DICHLOROPROPENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,2,3-TRICHLOROBENZENE	ug/L		<7.5 U	<6 U	NA	<15 U	NA	<0.3 U	NA	NA	<0.3 U	NA	NA
1,2,3-TRICHLOROPROPANE	ug/L		<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
1,2,4-TRICHLOROBENZENE	ug/L	70	<10 U	<8 U	NA	<20 U	NA	<0.4 U	NA	NA	<0.4 U	NA	NA
1,2,4-TRIMETHYLBENZENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,2-DIBROMO-3-CHLOROPROP	ug/L	0.2	<50 U	<40 U	NA	<100 U	NA	<2 U	NA	NA	<2 U	NA	NA
1,2-DIBROMOETHANE	ug/L	600	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,2-DICHLOROBENZENE	ug/L		<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
1,2-DICHLOROETHANE	ug/L	5	25.9	32.1	NA	25.4	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,2-DICHLOROPROPANE	ug/L	5	<10 U	<8 U	NA	<20 U	NA	<0.4 U	NA	NA	<0.4 U	NA	NA
1,3,5-TRIMETHYLBENZENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,3-DICHLOROBENZENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
1,3-DICHLOROPROPANE	ug/L		<10 U	<8 U	NA	<20 U	NA	<0.4 U	NA	NA	<0.4 U	NA	NA
1,4-DICHLOROBENZENE	ug/L	75	<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
2,2-DICHLOROPROPANE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
2-BUTANONE	ug/L		<125 U	<100 U	NA	<250 U	NA	<5 U	NA	NA	<5 U	NA	NA
2-CHLOROTOLUENE	ug/L		<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
2-HEXANONE	ug/L		<125 U	<100 U	NA	<250 U	NA	<5 U	NA	NA	<5 U	NA	NA
4-CHLOROTOLUENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
4-METHYL-2-PENTANONE	ug/L		<125 U	<100 U	NA	<250 U	NA	<5 U	NA	NA	<5 U	NA	NA
ACETONE	ug/L		156 J	<100 U	NA	<250 U	NA	<5 U	NA	NA	<5 U	NA	NA
BENZENE	ug/L	5	<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
BROMOBENZENE	ug/L		<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
BROMOCHLOROMETHANE	ug/L		<10 U	<8 U	NA	<20 U	NA	<0.4 U	NA	NA	<0.4 U	NA	NA
BROMODICHLOROMETHANE	ug/L	80	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
BROMOFORM	ug/L	80	<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
BROMOMETHANE	ug/L		<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
CARBON DISULFIDE	ug/L		<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
CARBON TETRACHLORIDE	ug/L	5	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
CHLOROBENZENE	ug/L	100	<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
CHLOROETHANE	ug/L		<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
CHLOROFORM	ug/L	80	13.4 J	14.5	NA	14.2	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
CHLOROMETHANE	ug/L		<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
CIS-1,2-DICHLOROETHENE	ug/L	70	2190	3130	NA	2970	NA	2.32	NA	NA	2.56	NA	NA
CIS-1,3-DICHLOROPROPENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
DIBROMOCHLOROMETHANE	ug/L	80	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
DIBROMOMETHANE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
DICHLORODIFLUOROMETHANE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
ETHYLBENZENE	ug/L	700	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
HEXACHLOROBUTADIENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
ISOPROPYLBENZENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
m,p-Xylene	ug/L		<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
METHYLENE CHLORIDE	ug/L	5	688	86.7	NA	308	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
NAPHTHALENE	ug/L		<10 U	<8 U	NA	<20 U	NA	<0.4 U	NA	NA	<0.4 U	NA	NA
N-BUTYLBENZENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
N-PROPYLBENZENE	ug/L		<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
O-XYLENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
P-ISOPROPYLTOLUENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
SEC-BUTYLBENZENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
STYRENE	ug/L	100	<6.25 U	<5 U	NA	<12.5 U	NA	<0.25 U	NA	NA	<0.25 U	NA	NA
TERT-BUTYLBENZENE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
TETRACHLOROETHENE	ug/L	5	11.5 J	11.4	NA	22.6	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
TOLUENE	ug/L	1000	<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
TRANS-1,2-DICHLOROETHENE	ug/L	100	8.49 J	11.4	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
TRANS-1,3-DICHLOROPROPEN	ug/L		<25 U	<20 U	NA	<50 U	NA	<1 U	NA	NA	<1 U	NA	NA
TRICHLOROETHENE	ug/L	5	5310	7740	NA	6720	NA	0.928 J	NA	NA	1.17	NA	NA
TRICHLOROFLUOROMETHANE	ug/L		<12.5 U	<10 U	NA	<25 U	NA	<0.5 U	NA	NA	<0.5 U	NA	NA
VINYL CHLORIDE	ug/L	2	23.6 J	40.3	NA	24.9	NA	1.63	NA	NA	<0.5 U	NA	NA
Semi-Volatile Organic Compounds (8270D)													
HEXACHLOROBENZENE	ug/L	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anions (9056)													
CHLORIDE	mg/L		NA	NA	NA	NA	641	700	NA	694	673	NA	672
SULFATE	mg/L		NA	NA	NA	NA	379	391	NA	381	368	NA	295
Chromium Trivalent (SM 3500-CR)													
Chromium, Trivalent	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Units	MCL	LH18/24-SP650-6049-GRAB 1/28/2013 Spigot	LH18/24-SP650-6051-GRAB 2/4/2013 Spigot	LH18/24-SP650-6052-GRAB 2/4/2013 Spigot	LH18/24-SP650-6054-COMP 2/11/2013 Holding Jar/Spigot	LH18/24-SP650-6054-GRAB 2/11/2013 Spigot	LH18/24-SP650-6056-GRAB 2/18/2013 Spigot	LH18/24-SP650-6058-GRAB 3/11/2013 Spigot	LH18/24-SP650-6059-COMP 3/11/2013 Holding Jar/Spigot	LH18/24-SP650-6059-GRAB 3/11/2013 Spigot	LH18/24-SP650-6061-COMP 3/18/2013 Holding Jar/Spigot	LH18/24-SP650-6061-GRAB 3/18/2013 Spigot
ID Location:			GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Biweekly	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 Weekly	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 a spigot on the discharge of effluent TK-650 Sampled Weekly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Monthly	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 Quarterly	GWTP – Collected from a spigot on the discharge of effluent TK-650 Sampled Quarterly
Oil and Grease (1664A)													
OIL & GREASE	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	5 J	2.8 J
Ammonia (350.1)													
AMMONIA AS N	mg/L		NA	NA	7.71	NA	NA	4.66	NA	NA	NA	NA	NA
Ortho-Phosphate (365.2)													
ORTHO-PHOSPHATE	mg/L		NA	NA	1.15	NA	NA	0.574	NA	NA	NA	NA	NA
Chemical Oxygen Demand (410.4)													
CHEMICAL OXYGEN DEMAND	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	20.7 J	52.5 J
Total Organic Carbon (415.1)													
TOTAL ORGANIC CARBON (TO	mg/L		NA	NA	3.75	NA	NA	4.47	NA	NA	NA	NA	NA
Metals (6010C and 6020A)													
ALUMINUM	mg/L		NA	<0.1 U	NA	NA	NA	NA	<0.1 U	NA	NA	<0.1 U	<0.1 U
IRON	mg/L		NA	0.588	NA	NA	NA	NA	0.0897	NA	NA	0.0816 J	0.0657 J
SELENIUM	mg/L	0.05	<0.01 U	<0.01 U	NA	<0.01 U	<0.01 U	NA	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
ANTIMONY	mg/L	0.006	NA	<0.001 U	NA	NA	NA	NA	<0.001 U	NA	NA	<0.001 U	<0.001 U
ARSENIC	mg/L	0.01	NA	0.00241	NA	NA	NA	NA	0.00741	NA	NA	0.00292	0.00392
BARIUM	mg/L	2	NA	0.147	NA	NA	NA	NA	0.0802	NA	NA	0.0875	0.0885
CADMIUM	mg/L	0.005	NA	<0.0006 U	NA	NA	NA	NA	<0.0006 U	NA	NA	<0.0006 U	<0.0006 U
CHROMIUM	mg/L		NA	0.00339 J	NA	NA	NA	NA	0.00432	NA	NA	0.00407	0.00334 J
COBALT	mg/L	0.015	NA	0.00108 J	NA	NA	NA	NA	0.0011	NA	NA	0.000646 J	0.000606 J
LEAD	mg/L		<0.001 U	<0.001 U	NA	<0.001 U	<0.001 U	NA	0.000583	<0.001 U	<0.001 U	<0.001 U	<0.001 U
MANGANESE	mg/L		NA	0.318	NA	NA	NA	NA	0.159	NA	NA	0.118	0.115
NICKEL	mg/L		NA	0.00634 J	NA	NA	NA	NA	0.00471	NA	NA	0.00324 J	0.00298 J
SILVER	mg/L	0.002	<0.001 U	<0.001 U	NA	<0.001 U	<0.001 U	NA	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
THALLIUM	mg/L		NA	0.000104 J	NA	NA	NA	NA	<0.0002 U	NA	NA	<0.0002 U	<0.0002 U
VANADIUM	mg/L		NA	<0.001 U	NA	NA	NA	NA	<0.001 U	NA	NA	<0.001 U	<0.001 U
ZINC	mg/L		NA	<0.025 U	NA	NA	NA	NA	0.0313	NA	NA	<0.025 U	<0.025 U
Perchlorate (6850)													
PERCHLORATE	ug/L		<0.2 U	NA	<0.2 U	<0.2 U	<0.2 U	<0.2 U	NA	<0.2 U	<0.2 U	<0.2 U	<0.2 U
Hexavalent Chromium (7196A)													
HEXAVALENT CHROMIUM	mg/L		<0.01 UJ	NA	NA	<0.01 U	<0.01 U	NA	NA	<0.01 U	<0.01 U	<0.01 U	<0.01 U
Volatile Organic Compounds (8260B)													
1,1,1,2-TETRACHLOROETHANE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		<0.4 U	NA	NA	NA	<0.4 U	NA	NA	NA	<0.4 U	NA	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,1-DICHLOROETHANE	ug/L		<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
1,1-DICHLOROPROPENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		<0.3 U	NA	NA	NA	<0.3 U	NA	NA	NA	<0.3 U	NA	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	NA	NA	NA	<0.4 U	NA	NA	NA	<0.4 U	NA	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,2-DIBROMO-3-CHLOROPROP	ug/L	0.2	<2 U	NA	NA	NA	<2 U	NA	NA	NA	<2 U	NA	<2 U
1,2-DIBROMOETHANE	ug/L	600	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,2-DICHLOROBENZENE	ug/L		<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	NA	NA	NA	<0.4 U	NA	NA	NA	<0.4 U	NA	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,3-DICHLOROBENZENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
1,3-DICHLOROPROPANE	ug/L		<0.4 U	NA	NA	NA	<0.4 U	NA	NA	NA	<0.4 U	NA	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
2,2-DICHLOROPROPANE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
2-BUTANONE	ug/L		<5 U	NA	NA	NA	<5 U	NA	NA	NA	<5 U	NA	<5 U
2-CHLOROTOLUENE	ug/L		<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
2-HEXANONE	ug/L		<5 U	NA	NA	NA	<5 U	NA	NA	NA	<5 U	NA	<5 U
4-CHLOROTOLUENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
4-METHYL-2-PENTANONE	ug/L		<5 U	NA	NA	NA	<5 U	NA	NA	NA	<5 U	NA	<5 U
ACETONE	ug/L		<5 UJ	NA	NA	NA	<5 U	NA	NA	NA	2.55	NA	4.32 J
BENZENE	ug/L	5	<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
BROMOBENZENE	ug/L		<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
BROMOCHLOROMETHANE	ug/L		<0.4 U	NA	NA	NA	<0.4 U	NA	NA	NA	<0.4 U	NA	<0.4 U
BROMODICHLOROMETHANE	ug/L	80	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
BROMOFORM	ug/L	80	<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
BROMOMETHANE	ug/L		<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
CARBON DISULFIDE	ug/L		<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	24.7
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
CHLOROETHANE	ug/L		<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
CHLOROFORM	ug/L	80	<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
CHLOROMETHANE	ug/L		<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	2.45	NA	NA	NA	2.28	NA	NA	NA	1.87	NA	1.98
CIS-1,3-DICHLOROPROPENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	80	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
DIBROMOMETHANE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
HEXACHLOROBUTADIENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
ISOPROPYLBENZENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
m,p-Xylene	ug/L		<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
NAPHTHALENE	ug/L		<0.4 U	NA	NA	NA	<0.4 U	NA	NA	NA	<0.4 U	NA	<0.4 U
N-BUTYLBENZENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
N-PROPYLBENZENE	ug/L		<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
O-XYLENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
SEC-BUTYLBENZENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
STYRENE	ug/L	100	<0.25 U	NA	NA	NA	<0.25 U	NA	NA	NA	<0.25 U	NA	<0.25 U
TERT-BUTYLBENZENE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
TRANS-1,3-DICHLOROPROPEN	ug/L		<1 U	NA	NA	NA	<1 U	NA	NA	NA	<1 U	NA	<1 U
TRICHLOROETHENE	ug/L	5	1.01	NA	NA	NA	1.03	NA	NA	NA	0.966	NA	1.06
TRICHLOROFLUOROMETHANE	ug/L		<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	NA	NA	NA	<0.5 U	NA	NA	NA	<0.5 U	NA	<0.5 U
Semi-Volatile Organic Compounds (8270D)													
HEXACHLOROBENZENE	ug/L	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	<0.5 UJ	<0.5 U
Anions (9056)													
CHLORIDE	mg/L		651	NA	NA	669	632	NA	NA	763	745	669	670
SULFATE	mg/L		264	NA	NA	269	279	NA	NA	194	182	230	225
Chromium Trivalent (SM 3500-CR)													
Chromium, Trivalent	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	0.00407	0.00334 J

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Units	MCL	LH18/24-SP650-6063-COMP 3/25/2013 Holding Jar/Spigot	LH18/24-SP650-6063-GRAB 3/25/2013 Spigot	LH18/24-SP650-6065-GRAB 4/2/2013 Spigot	LH18/24-SP650-6066-Grab 4/2/2013 Spigot	LH18/24-SP650-6066-GRAB 4/2/2013 Spigot	LH18/24-SP650-6068-COMP 4/8/2013 Holding Jar/Spigot	LH18/24-SP650-6068-GRAB 4/8/2013 Spigot	LH18/24-SP650-6070-GRAB 4/15/2013 Spigot	LH18/24-SP650-6072-COMP 4/22/2013 Holding Jar/Spigot	LH18/24-SP650-6072-GRAB 4/22/2013 Spigot
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 a spigot on the discharge of effluent TK-650 Sampled Monthly	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 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 a spigot on the discharge of effluent TK-650 Sampled Wekly	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
Oil and Grease (1664A)												
OIL & GREASE	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ammonia (350.1)												
AMMONIA AS N	mg/L		NA	NA	NA	NA	15.5	NA	NA	7.65	NA	NA
Ortho-Phosphate (365.2)												
ORTHO-PHOSPHATE	mg/L		NA	NA	NA	NA	1.39	NA	NA	1.4	NA	NA
Chemical Oxygen Demand (410.4)												
CHEMICAL OXYGEN DEMAND	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Organic Carbon (415.1)												
TOTAL ORGANIC CARBON (TO	mg/L		NA	NA	NA	NA	4.52	NA	NA	4.88	NA	NA
Metals (6010C and 6020A)												
ALUMINUM	mg/L		NA	NA	0.0797	NA	NA	NA	NA	NA	NA	NA
IRON	mg/L		NA	NA	0.282	NA	NA	NA	NA	NA	NA	NA
SELENIUM	mg/L	0.05	<0.01 U	<0.01 U	<0.01 U	NA	NA	<0.01 U	<0.01 U	NA	<0.01 U	<0.01 U
ANTIMONY	mg/L	0.006	NA	NA	0.000527	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/L	0.01	NA	NA	0.00464	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/L	2	NA	NA	0.212	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/L	0.005	NA	NA	<0.0006 U	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/L		NA	NA	0.00845	NA	NA	NA	NA	NA	NA	NA
COBALT	mg/L	0.015	NA	NA	0.00121	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/L		<0.001 U	<0.001 U	<0.001 U	NA	NA	<0.001 U	<0.001 U	NA	<0.001 U	<0.001 U
MANGANESE	mg/L		NA	NA	0.401	NA	NA	NA	NA	NA	NA	NA
NICKEL	mg/L		NA	NA	0.00969	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/L	0.002	<0.001 U	<0.001 U	<0.001 U	NA	NA	<0.001 U	<0.001 U	NA	<0.001 U	<0.001 U
THALLIUM	mg/L		NA	NA	<0.0002 U	NA	NA	NA	NA	NA	NA	NA
VANADIUM	mg/L		NA	NA	<0.001 U	NA	NA	NA	NA	NA	NA	NA
ZINC	mg/L		NA	NA	0.0184	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)												
PERCHLORATE	ug/L		<0.2 U	<0.2 U	NA	<0.1 U	NA	<0.2 U	<0.2 U	<0.2 U	<0.2 U	18.9
Hexavalent Chromium (7196A)												
HEXAVALENT CHROMIUM	mg/L		<0.01 U	<0.01 U	NA	NA	NA	<0.01 U	<0.01 U	NA	<0.01 U	<0.01 U
Volatile Organic Compounds (8260B)												
1,1,1,2-TETRACHLOROETHANE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		NA	<0.4 U	NA	NA	NA	NA	<0.4 U	NA	NA	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,1-DICHLOROETHANE	ug/L		NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
1,1-DICHLOROPROPENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		NA	<0.3 U	NA	NA	NA	NA	<0.3 U	NA	NA	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	NA	<0.4 U	NA	NA	NA	NA	<0.4 U	NA	NA	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,2-DIBROMO-3-CHLOROPROP	ug/L	0.2	NA	<2 U	NA	NA	NA	NA	<2 U	NA	NA	<2 U
1,2-DIBROMOETHANE	ug/L	600	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,2-DICHLOROBENZENE	ug/L		NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	NA	<0.4 U	NA	NA	NA	NA	<0.4 U	NA	NA	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,3-DICHLOROBENZENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
1,3-DICHLOROPROPANE	ug/L		NA	<0.4 U	NA	NA	NA	NA	<0.4 U	NA	NA	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
2,2-DICHLOROPROPANE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
2-BUTANONE	ug/L		NA	<5 U	NA	NA	NA	NA	<5 U	NA	NA	<5 U
2-CHLOROTOLUENE	ug/L		NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
2-HEXANONE	ug/L		NA	<5 U	NA	NA	NA	NA	<5 U	NA	NA	<5 U
4-CHLOROTOLUENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
4-METHYL-2-PENTANONE	ug/L		NA	<5 U	NA	NA	NA	NA	<5 U	NA	NA	<5 U
ACETONE	ug/L		NA	2.58	NA	NA	NA	NA	3.08	NA	NA	<5 U
BENZENE	ug/L	5	NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
BROMOBENZENE	ug/L		NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
BROMOCHLOROMETHANE	ug/L		NA	<0.4 U	NA	NA	NA	NA	<0.4 U	NA	NA	<0.4 U
BROMODICHLOROMETHANE	ug/L	80	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
BROMOFORM	ug/L	80	NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
BROMOMETHANE	ug/L		NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
CARBON DISULFIDE	ug/L		NA	4.6	NA	NA	NA	NA	5.17	NA	NA	5.3
CARBON TETRACHLORIDE	ug/L	5	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
CHLOROBENZENE	ug/L	100	NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
CHLOROETHANE	ug/L		NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
CHLOROFORM	ug/L	80	NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
CHLOROMETHANE	ug/L		NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	NA	1.66	NA	NA	NA	NA	1.8	NA	NA	1.9
CIS-1,3-DICHLOROPROPENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	80	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
DIBROMOMETHANE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
ETHYLBENZENE	ug/L	700	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
HEXACHLOROBUTADIENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
ISOPROPYLBENZENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
m,p-Xylene	ug/L		NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
METHYLENE CHLORIDE	ug/L	5	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
NAPHTHALENE	ug/L		NA	<0.4 U	NA	NA	NA	NA	<0.4 U	NA	NA	<0.4 U
N-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
N-PROPYLBENZENE	ug/L		NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
O-XYLENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
SEC-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
STYRENE	ug/L	100	NA	<0.25 U	NA	NA	NA	NA	<0.25 U	NA	NA	<0.25 U
TERT-BUTYLBENZENE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
TETRACHLOROETHENE	ug/L	5	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
TOLUENE	ug/L	1000	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
TRANS-1,3-DICHLOROPROPEN	ug/L		NA	<1 U	NA	NA	NA	NA	<1 U	NA	NA	<1 U
TRICHLOROETHENE	ug/L	5	NA	0.894	NA	NA	NA	NA	1.01	NA	NA	1.05
TRICHLOROFLUOROMETHANE	ug/L		NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
VINYL CHLORIDE	ug/L	2	NA	<0.5 U	NA	NA	NA	NA	<0.5 U	NA	NA	<0.5 U
Semi-Volatile Organic Compounds (8270D)												
HEXACHLOROBENZENE	ug/L	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anions (9056)												
CHLORIDE	mg/L		837	876	NA	NA	NA	725	782	NA	762	794
SULFATE	mg/L		273	280	NA	NA	NA	290	283	NA	203	194
Chromium Trivalent (SM 3500-CR)												
Chromium, Trivalent	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: / Date Sampled:	Unit	MCL	18CPT-01, 69_5-70_5 3/6/2013	18CPT08 (64) 130313 3/13/2013	18CPT-10, 63-64', 180313 3/18/2013	18CPT12 (64) 140313 3/14/2013	18CPT-13, 35-36 3/5/2013	18CPT-15, 14-18', 180313 3/18/2013	18CPT-15, 25-29', 180313 3/18/2013	18CPT-15, 38-42', 180313 3/18/2013	18CPT17 (30-34) 220313 3/22/2013
ID Location:			Site 18/24 – NE, inside the fence line, middle region Sampled Quarterly	Site 18/24 – N, inside the fence line, outter region	Site 18/24 – WSW, outside the fence line, just along the perimeter road	Site 18/24 – SSW, outside the fence line, just along the perimeter road	Site 18/24 – SSE, outside the fence line, to the left of the road heading into site 18/24	Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – , the fence line, region Sampled Quarterly
Metals (6010C and 6020A)											
ALUMINUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
IRON	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
ANTIMONY	mg/L	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/L	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
COBALT	mg/L	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
NICKEL	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/L		21.3	66000	13800	1470	41600	2620	87.5	6.16	NA
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,1,2,2-TETRACHLOROETHANE	ug/L		<0.4 U	<1 U	<0.4 U	<2 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<40 U
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,1-DICHLOROETHANE	ug/L		<0.25 U	2.25 J	<0.25 U	<1.25 U	<0.25 U	0.166 J	<0.25 U	<0.25 U	<25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<2.5 U	<1 U	<5 U	<1 U	<1 U	<1 U	<1 U	<100 U
1,1-DICHLOROPROPENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,2,3-TRICHLOROBENZENE	ug/L		<0.3 U	<0.75 U	<0.3 U	<1.5 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<30 U
1,2,3-TRICHLOROPROPANE	ug/L		<1 U	<2.5 U	<1 U	<5 U	<1 U	<1 U	<1 U	<1 U	<100 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<1 U	<0.4 U	<2 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<40 U
1,2,4-TRIMETHYLBENZENE	ug/L		0.537 J	<1.25 U	<0.5 U	<2.5 U	0.342 J	<0.5 U	<0.5 U	<0.5 U	<50 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<5 U	<2 U	<10 U	<2 U	<2 U	<2 U	<2 U	<200 U
1,2-DIBROMOETHANE	ug/L	600	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,2-DICHLOROBENZENE	ug/L		<0.25 U	<0.625 U	<0.25 U	<1.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<1 U	<0.4 U	<2 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<40 U
1,3,5-TRIMETHYLBENZENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,3-DICHLOROBENZENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
1,3-DICHLOROPROPANE	ug/L		<0.4 U	<1 U	<0.4 U	<2 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<40 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.625 U	<0.25 U	<1.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<25 U
2,2-DICHLOROPROPANE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
2-BUTANONE	ug/L		<5 U	<12.5 U	8.66 J	<25 U	3.2 J	<5 U	<5 U	<5 U	<500 U
2-CHLOROTOLUENE	ug/L		<0.25 U	<0.625 U	<0.25 U	<1.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<25 U
2-HEXANONE	ug/L		<5 U	<12.5 U	<5 U	<25 U	<5 U	<5 U	<5 U	<5 U	<500 U
4-CHLOROTOLUENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
4-METHYL-2-PENTANONE	ug/L		<5 U	<12.5 U	<5 U	<25 U	<5 U	<5 U	<5 U	<5 U	<500 U
ACETONE	ug/L		<5 U	<12.5 U	30.1	<25 U	11.7	5 J	3.38 J	2.52 J	<500 U
BENZENE	ug/L	5	1.19	<0.625 U	0.286 J	<1.25 U	0.266 J	0.188 J	0.145 J	<0.25 U	<25 U
BROMOBENZENE	ug/L		<0.25 U	<0.625 U	<0.25 U	<1.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<25 U
BROMOCHLOROMETHANE	ug/L		<0.4 U	<1 U	<0.4 U	<2 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<40 U
BROMODICHLOROMETHANE	ug/L	80	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
BROMOFORM	ug/L	80	<1 U	<2.5 U	<1 U	<5 U	<1 U	<1 U	<1 U	<1 U	<100 U
BROMOMETHANE	ug/L		<1 U	<2.5 U	<1 U	<5 U	<1 U	<1 U	<1 U	<1 U	<100 U
CARBON DISULFIDE	ug/L		<1 U	<2.5 U	<1 U	<5 U	<1 U	<1 U	<1 U	<1 U	<100 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.625 U	<0.25 U	<1.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<25 U
CHLOROETHANE	ug/L		<1 U	<2.5 U	<1 U	<5 U	<1 U	<1 U	<1 U	<1 U	<100 U
CHLOROFORM	ug/L	80	<0.25 U	0.358 J	<0.25 U	<1.25 U	0.21 J	<0.25 U	<0.25 U	<0.25 U	<25 U
CHLOROMETHANE	ug/L		<1 U	<2.5 U	<1 UJ	<5 U	<1 U	<1 UJ	<1 UJ	<1 UJ	<100 U
CIS-1,2-DICHLOROETHENE	ug/L	70	0.945 J	11.3	0.531 J	<2.5 U	0.925 J	1.19	<0.5 U	<0.5 U	<50 U
CIS-1,3-DICHLOROPROPENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
DIBROMOCHLOROMETHANE	ug/L	80	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
DIBROMOMETHANE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
DICHLORODIFLUOROMETHANE	ug/L		<0.5 UJ	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
ETHYLBENZENE	ug/L	700	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
HEXACHLOROBUTADIENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
ISOPROPYLBENZENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
m,p-Xylene	ug/L		0.507 J	<2.5 U	0.757 J	<5 U	0.516 J	<1 U	<1 U	<1 U	<100 U
METHYLENE CHLORIDE	ug/L	5	182	0.697 J	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
NAPHTHALENE	ug/L		0.494 J	<1 U	<0.4 U	<2 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<40 U
N-BUTYLBENZENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
N-PROPYLBENZENE	ug/L		<0.25 U	<0.625 U	<0.25 U	<1.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<25 U
O-XYLENE	ug/L		0.425 J	<1.25 U	0.324 J	<2.5 U	0.288 J	<0.5 U	<0.5 U	<0.5 U	<50 U
P-ISOPROPYLTOLUENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
SEC-BUTYLBENZENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
STYRENE	ug/L	100	<0.25 U	<0.625 U	<0.25 U	<1.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<25 U
TERT-BUTYLBENZENE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
TOLUENE	ug/L	1000	0.754 J	0.902 J	1.47	14.5	0.857 J	0.77 J	0.726 J	<0.5 U	<50 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
TRANS-1,3-DICHLOROPROPENE	ug/L		<1 U	<2.5 U	<1 U	<5 U	<1 U	<1 U	<1 U	<1 U	<100 U
TRICHLOROETHENE	ug/L	5	2.42	29.1	33.1	59.7	22.8	3.53	<0.5 U	<0.5 U	<50 U
TRICHLOROFLUOROMETHANE	ug/L		<0.5 U	<1.25 U	<0.5 U	<2.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<50 U
VINYL CHLORIDE	ug/L	2	<0.5 U	5.56	<0.5 U	<2.5 U	<0.5 U	0.776 J	<0.5 U	<0.5 U	<50 U
Semi-Volatile Organic Compounds (8270D)											
HEXACHLOROBENZENE	ug/L	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium Trivalent (SM 3500-CR)											
Chromium, Trivalent	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	MCL	18CPT18 (31-35)-200313 3/20/2013	18CPT18 (44-48)-210313 3/21/2013	18CPT18 (44-48)-210313D 3/21/2013	18CPT18 (45-49)-210313 3/21/2013	18CPT19 (30-34) 220313 3/22/2013	18CPT21 (24-28) 270313 3/27/2013	18CPT25 (28-32) 260313 3/26/2013	46DPT10 (44-49) 220413 4/22/2013	46DPT11 (44-49) 220413 4/22/2013
ID Location:			Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – , the fence line, region Sampled Quarterly	Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region	Site 46 - N, within the site boundary, middle region	Site 46 - N, within the site boundary, outter region
Metals (6010C and 6020A)											
ALUMINUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
IRON	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
ANTIMONY	mg/L	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/L	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
COBALT	mg/L	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
NICKEL	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/L		12.8	1.35	1.4	7.12	10.1	4.72	NA	NA	NA
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 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	<5 U	104	<1.67 U	<0.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.8 U	<1.33 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	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	20.6	<0.833 U	<0.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	<1 U	<1 U	<10 U	456	9.99	<1 U	<1 U
1,1-DICHLOROPROPENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		<0.3 U	<0.3 U	<0.3 U	<0.3 U	<3 U	<0.6 U	<1 U	<0.3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		<1 U	<1 U	<1 U	<1 U	<10 U	<2 U	<3.33 U	<1 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.8 U	<1.33 U	<0.4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<20 U	<4 U	<6.67 U	<2 U	<2 U
1,2-DIBROMOETHANE	ug/L	600	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.5 U	<0.833 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	<5 U	<1 U	<1.67 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	<4 U	<0.8 U	<1.33 U	<0.4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.8 U	<1.33 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	<2.5 U	<0.5 U	<0.833 U	<0.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
2-BUTANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<50 U	6.79 J	<16.7 U	<5 U	<5 U
2-CHLOROTOLUENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.5 U	<0.833 U	<0.25 U	<0.25 U
2-HEXANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<50 U	<10 U	<16.7 U	<5 U	<5 U
4-CHLOROTOLUENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<50 U	<10 U	<16.7 U	<5 U	<5 U
ACETONE	ug/L		5.52 J	<5 U	<5 U	6.51 J	<50 U	<10 U	8.6 J	138	<5 U
BENZENE	ug/L	5	0.151 J	<0.25 U	<0.25 U	0.127 J	<2.5 U	0.294 J	<0.833 U	<0.25 U	<0.25 U
BROMOBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.5 U	<0.833 U	<0.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.8 U	<1.33 U	<0.4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	80	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
BROMOFORM	ug/L	80	<1 U	<1 U	<1 U	<1 U	<10 U	<2 U	<3.33 U	<1 U	<1 U
BROMOMETHANE	ug/L		<1 U	<1 U	<1 U	<1 U	<10 U	<2 U	<3.33 U	<1 U	<1 U
CARBON DISULFIDE	ug/L		<1 U	<1 U	<1 U	<1 U	<10 U	<2 U	<3.33 U	<1 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.5 U	<0.833 U	<0.25 U	<0.25 U
CHLOROETHANE	ug/L		<1 U	<1 U	<1 U	<1 U	<10 U	<2 U	<3.33 U	<1 U	<1 U
CHLOROFORM	ug/L	80	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	4.79	<0.833 U	<0.25 U	<0.25 U
CHLOROMETHANE	ug/L		<1 U	<1 U	<1 U	<1 U	<10 U	<2 U	<3.33 U	<1 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	304	5.55	<0.5 U	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	80	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
DIBROMOMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	8.45	<1.67 U	<0.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
m,p-Xylene	ug/L		<1 U	<1 U	<1 U	<1 U	<10 U	4.69	<3.33 U	<1 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	7270	<1.67 U	<0.5 U	<0.5 U
NAPHTHALENE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<4 U	<0.8 U	<1.33 U	<0.4 U	<0.4 U
N-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
N-PROPYLBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	<0.5 U	<0.833 U	<0.25 U	<0.25 U
O-XYLENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	0.763 J	<1.67 U	<0.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<2.5 U	2.69	<0.833 U	<0.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	226	<1.67 U	<0.5 U	<0.5 U
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	6.3	<1.67 U	<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	<5 U	12.6	<1.67 U	<0.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		<1 U	<1 U	<1 U	<1 U	<10 U	<2 U	<3.33 U	<1 U	<1 U
TRICHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	11700	77.6	<0.5 U	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	<1 U	<1.67 U	<0.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<5 U	18.8	<1.67 U	<0.5 U	<0.5 U
Semi-Volatile Organic Compounds (8270D)											
HEXACHLOROBENZENE	ug/L	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium Trivalent (SM 3500-CR)											
Chromium, Trivalent	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	MCL	46DPT11 (44-49) 220413D 4/22/2013	46DPT12 (46-49) 230413 4/23/2013	67DPT08 (25-30) 030413 4/3/2013	67DPT11 (25-30) 040413 4/4/2013	67DPT11A (23-27)-160413 4/16/2013	FACILITY WATER NORTH-220313	GPW 1-021413 2/14/2013	GPW 1-031113 3/11/2013	GPW 3-021413 2/14/2013
ID Location:			Site 46 - N, within the site boundary, outter region	Site 46 - NNE, within the site boundary, middle region	Site 67 - SSE, within the site boundary, middle region	Site 67 - S, within the site boundary, outter region	Site 67 - TBD	Well Water Supply From the Groundwater Treatment Plant	Goose Prairie Creek - Grab sample, collected off a bridge on the north side of LHAAP-50 Sampled Quarterly if the creek contains water	Goose Prairie Creek - Grab sample, collected off a bridge on the north side of LHAAP-50 Sampled Quarterly if the creek contains water	Goose Prairie Creek – Grab sample, collected near a bridge inside of LHAAP-47 Sampled Quarterly if the creek contains water
Metals (6010C and 6020A)											
ALUMINUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
IRON	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
SELENIUM	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	NA	NA
ANTIMONY	mg/L	0.006	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/L	0.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/L	2	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
COBALT	mg/L	0.015	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
MANGANESE	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
NICKEL	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	NA	NA
THALLIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
VANADIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
ZINC	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/L		NA	NA	NA	NA	NA	<0.2 U	1.65	0.735	1.74
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
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	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	NA	NA
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	8.26	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
1,1-DICHLOROETHANE	ug/L		<0.25 U	<0.25 U	40.1	9.16	<0.25 U	<0.25 U	NA	NA	NA
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	539	32	<1 U	<1 U	NA	NA	NA
1,1-DICHLOROPROPENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
1,2,3-TRICHLOROBENZENE	ug/L		<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	<0.3 U	NA	NA	NA
1,2,3-TRICHLOROPROPANE	ug/L		<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
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	NA	NA	NA
1,2,4-TRIMETHYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	0.295 J	<0.5 U	NA	NA	NA
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<2 U	<2 U	NA	NA	NA
1,2-DIBROMOETHANE	ug/L	600	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
1,2-DICHLOROBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	75.9	1.13	<0.5 U	<0.5 U	NA	NA	NA
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	NA	NA
1,3,5-TRIMETHYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
1,3-DICHLOROBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
1,3-DICHLOROPROPANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	NA	NA
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
2,2-DICHLOROPROPANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
2-BUTANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	NA	NA	NA
2-CHLOROTOLUENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
2-HEXANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	NA	NA	NA
4-CHLOROTOLUENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
4-METHYL-2-PENTANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<5 U	<5 U	NA	NA	NA
ACETONE	ug/L		<5 U	4 J	3.18 J	2.68 J	8.35 J	<5 U	NA	NA	NA
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
BROMOBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
BROMOCHLOROMETHANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	NA	NA
BROMODICHLOROMETHANE	ug/L	80	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
BROMOFORM	ug/L	80	<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
BROMOMETHANE	ug/L		<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
CARBON DISULFIDE	ug/L		<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
CHLOROETHANE	ug/L		<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
CHLOROFORM	ug/L	80	<0.25 U	<0.25 U	0.737 J	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
CHLOROMETHANE	ug/L		<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
CIS-1,2-DICHLOROETHENE	ug/L	70	<0.5 U	<0.5 U	2.2	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
DIBROMOCHLOROMETHANE	ug/L	80	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
DIBROMOMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
DICHLORODIFLUOROMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
HEXACHLOROBUTADIENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
ISOPROPYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
m,p-Xylene	ug/L		<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
NAPHTHALENE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<0.4 U	NA	NA	NA
N-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
N-PROPYLBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
O-XYLENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
P-ISOPROPYLTOLUENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
SEC-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	NA	NA	NA
TERT-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
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	NA	NA	NA
TRANS-1,3-DICHLOROPROPENE	ug/L		<1 U	<1 U	<1 U	<1 U	<1 U	<1 U	NA	NA	NA
TRICHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	3.48	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
TRICHLOROFLUOROMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	0.469 J	<0.5 U	<0.5 U	<0.5 U	NA	NA	NA
Semi-Volatile Organic Compounds (8270D)											
HEXACHLOROBENZENE	ug/L	1	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium Trivalent (SM 3500-CR)											
Chromium, Trivalent	mg/L		NA	NA	NA	NA	NA	NA	NA	NA	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	MCL	GPW 3-031113 3/11/2013	HBW 1 - 013013 1/30/2013	HBW 10 - 013013 1/30/2013	HBW 10-031113 3/11/2013	HBW 1-031113 3/11/2013	HBW 7 - 013013 1/30/2013	HBW 7-031113 3/11/2013	ICT11-021213 2/12/2013	ICT12A-021213 2/12/2013
ID Location:			Goose Prairie Creek – Grab sample, collected near a bridge inside of LHAAP-47 Sampled Quarterly if the creek contains water	Harrison Bayou - Grab sample, south of LHAAP-16, downhill, and below the pump house Sampled Quarterly if the creek contains water	Harrison Bayou - Grab sample, collected near the GWTP creek discharge Sampled Quarterly if the creek contains water	Harrison Bayou - Grab sample, collected near the GWTP creek discharge Sampled Quarterly if the creek contains water	Harrison Bayou - Grab sample, south of LHAAP-16, downhill, and below the pump house Sampled Quarterly if the creek contains water	Harrison Bayou - Grab sample, at the backside of the Well field, down in the woods Sampled Quarterly if the creek contains water	Harrison Bayou - Grab sample, at the backside of the Well field, down in the woods Sampled Quarterly if the creek contains water	Site 18/24 – S, inside the fence line, outter region Sampled Annualy	Site 18/24 – SSW, inside the fence line, outter region Sampled Annualy
Metals (6010C and 6020A)											
ALUMINUM	mg/L		NA	NA	NA	NA	NA	NA	NA	<0.1 U	<0.1 U
IRON	mg/L		NA	NA	NA	NA	NA	NA	NA	2.59	3.14
SELENIUM	mg/L	0.05	NA	NA	NA	NA	NA	NA	NA	<0.01 U	<0.01 U
ANTIMONY	mg/L	0.006	NA	NA	NA	NA	NA	NA	NA	<0.001 U	<0.001 U
ARSENIC	mg/L	0.01	NA	NA	NA	NA	NA	NA	NA	0.00224	0.000813 J
BARIUM	mg/L	2	NA	NA	NA	NA	NA	NA	NA	1.05	0.818
CADMIUM	mg/L	0.005	NA	NA	NA	NA	NA	NA	NA	0.000365 J	0.000423 J
CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	0.191	0.102
COBALT	mg/L	0.015	NA	NA	NA	NA	NA	NA	NA	0.00212	0.00808
LEAD	mg/L		NA	NA	NA	NA	NA	NA	NA	0.000622 J	0.000618 J
MANGANESE	mg/L		NA	NA	NA	NA	NA	NA	NA	0.364	0.275
NICKEL	mg/L		NA	NA	NA	NA	NA	NA	NA	0.0137	0.139
SILVER	mg/L	0.002	NA	NA	NA	NA	NA	NA	NA	<0.001 U	<0.001 U
THALLIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	0.000189 J	0.000199 J
VANADIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	<0.005 U	<0.005 U
ZINC	mg/L		NA	NA	NA	NA	NA	NA	NA	<0.025 U	0.064
Perchlorate (6850)											
PERCHLORATE	ug/L		0.754	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	<0.2 U	21700	3530
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/L		NA	NA	NA	NA	NA	NA	NA	<0.01 UJ	<0.01 UJ
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<4 UJ	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	NA	NA	NA	NA	NA	NA	NA	<10 U	0.809 J
1,1-DICHLOROPROPENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	NA	NA	NA	NA	NA	NA	NA	<4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	NA	NA	NA	NA	NA	NA	NA	<20 U	<2 U
1,2-DIBROMOETHANE	ug/L	600	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	5.36 J	2.03
1,2-DICHLOROPROPANE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	<4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
2-BUTANONE	ug/L		NA	NA	NA	NA	NA	NA	NA	<50 UJ	<5 U
2-CHLOROTOLUENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
2-HEXANONE	ug/L		NA	NA	NA	NA	NA	NA	NA	<50 UJ	<5 U
4-CHLOROTOLUENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L		NA	NA	NA	NA	NA	NA	NA	<50 UJ	<5 U
ACETONE	ug/L		NA	NA	NA	NA	NA	NA	NA	<50 U	<5 U
BENZENE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
BROMOBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
BROMOCHLOROMETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	80	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
BROMOFORM	ug/L	80	NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
BROMOMETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
CARBON DISULFIDE	ug/L		NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	<5 U	0.454 J
CHLOROBENZENE	ug/L	100	NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
CHLOROETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
CHLOROFORM	ug/L	80	NA	NA	NA	NA	NA	NA	NA	5.17 J	2.51
CHLOROMETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	NA	NA	NA	NA	NA	NA	NA	313	3.37
CIS-1,3-DICHLOROPROPENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	80	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
DIBROMOMETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
ETHYLBENZENE	ug/L	700	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
ISOPROPYLBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
m,p-Xylene	ug/L		NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
METHYLENE CHLORIDE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
NAPHTHALENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<4 U	<0.4 U
N-BUTYLBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
N-PROPYLBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
O-XYLENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
STYRENE	ug/L	100	NA	NA	NA	NA	NA	NA	NA	<2.5 U	<0.25 U
TERT-BUTYLBENZENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
TOLUENE	ug/L	1000	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		NA	NA	NA	NA	NA	NA	NA	<10 U	<1 U
TRICHLOROETHENE	ug/L	5	NA	NA	NA	NA	NA	NA	NA	2880	412
TRICHLOROFLUOROMETHANE	ug/L		NA	NA	NA	NA	NA	NA	NA	<5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	NA	NA	NA	NA	NA	NA	NA	<5 U	0.783 J
Semi-Volatile Organic Compounds (8270D)											
HEXACHLOROBENZENE	ug/L	1	NA	NA	NA	NA	NA	NA	NA	<0.5 U	<0.5 U
Chromium Trivalent (SM 3500-CR)											
Chromium, Trivalent	mg/L		NA	NA	NA	NA	NA	NA	NA	0.191	0.102

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	MCL	ICT12B-021213 2/12/2013	ICT12C-021213 2/12/2013	ICT12D-021213 2/12/2013	ICT12E-021213 2/12/2013	ICT12E-021213-DUP 2/12/2013	ICT13A-021213 2/12/2013	ICT13B-021213 2/12/2013	ICT13C-021213 2/12/2013	ICT13D-021213 2/12/2013
ID Location:			Site 18/24 – SW, ouside the fence line, just along the perimeter road Sampled Annualy	Site 18/24 – SW, inside the fence line, outter region Sampled Annualy	Site 18/24 – WSW, inside the fence line, outter region Sampled Annualy	Site 18/24 – W, inside the fence line, outter region Sampled Annualy	Site 18/24 – W, inside the fence line, outter region Sampled Annualy	Site 18/24 – W, outside the fence line, just along the perimeter road Sampled Annualy	Site 18/24 – WNW, inside the fence line, outter region Sampled Annualy	Site 18/24 – NW, outside the fence line, just along the perimeter road Sampled Annualy	Site 18/24 – NW, ouside the fence line, just along the perimeter road Sampled Annualy
Metals (6010C and 6020A)											
ALUMINUM	mg/L		<0.1 U	<0.1 U	<0.1 U	0.119 J	0.12 J	<0.1 U	0.0628 J	0.117 J	0.209
IRON	mg/L		0.213	1.87	11.2	0.812	0.764	1.28	0.99	88	12
SELENIUM	mg/L	0.05	<0.01 U	<0.01 U	<0.01 U	0.00594 J	0.00633 J	<0.01 U	<0.01 U	<0.01 U	<0.01 U
ANTIMONY	mg/L	0.006	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
ARSENIC	mg/L	0.01	0.00269	0.00222	0.00886	0.00208	0.00241	0.00192 J	0.00163 J	0.0248	0.00295
BARIUM	mg/L	2	0.283	0.178	0.199	0.409	0.4	0.19	0.634	0.923	2.09
CADMIUM	mg/L	0.005	<0.0006 U	<0.0006 U	<0.0006 U	0.00078 J	0.000864 J	<0.0006 U	<0.0006 U	<0.0006 U	<0.0006 U
CHROMIUM	mg/L		<0.002 U	0.0045	0.00205 J	0.0203	0.00946	0.00714	0.00562	0.608	0.0242
COBALT	mg/L	0.015	0.000902 J	0.00146 J	0.0227	0.0378	0.0391	0.0185	0.0443	0.0477	0.0666
LEAD	mg/L		<0.001 U	<0.001 U	<0.001 U	0.000742 J	<0.001 U	0.00345	<0.001 U	0.000731 J	0.00158 J
MANGANESE	mg/L		0.0555	0.0445	0.785	2.07	2.03	0.627	1.72	1.5	1.11
NICKEL	mg/L		0.00791 J	0.0151	0.0237	0.0388	0.033	0.0351	0.0495	0.327	0.135
SILVER	mg/L	0.002	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
THALLIUM	mg/L		0.00011 J	0.000201 J	0.000179 J	0.000116 J	0.000119 J	0.000127 J	0.000133 J	0.000124 J	0.000122 J
VANADIUM	mg/L		0.000625 J	0.00111 J	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	NA	<0.001 U
ZINC	mg/L		<0.025 U	0.0182 J	0.0209 J	0.0315 J	0.0317 J	0.0301 J	0.0497 J	0.0838	0.0767
Perchlorate (6850)											
PERCHLORATE	ug/L		379000	20900	32600	75100	74000	41600	45000	2620	1.08
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/L		<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		<10 UJ	<10 UJ	<100 U	<200 UJ	<400 U	<8 U	<0.8 U	<4 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	2.07	<5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L		<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	11.6 J	13.3	3.25 J	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	49.4 J	<25 U	<250 U	587 J	638 J	28.2 J	35.8	7.55 J	<1 U
1,1-DICHLOROPROPENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		<7.5 U	<7.5 U	<75 U	<150 U	<300 U	<6 U	<0.6 U	<3 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 U	<10 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<10 U	<10 U	<100 U	<200 U	<400 U	<8 U	<0.8 U	<4 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<50 U	<50 U	<500 U	<1000 U	<2000 U	<40 U	<4 U	<20 U	<2 U
1,2-DIBROMOETHANE	ug/L	600	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L		<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	<0.5 U	<2.5 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	104	122	215 J	164 J	<500 U	149	111	42.9	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<10 U	<10 U	<100 U	<200 U	<400 U	<8 U	<0.8 U	<4 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L		<10 U	<10 U	<100 U	<200 U	<400 U	<8 U	<0.8 U	<4 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	<0.5 U	<2.5 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
2-BUTANONE	ug/L		<125 UJ	<125 UJ	<1250 U	<2500 UJ	<5000 U	<100 U	<10 U	<50 U	<5 UJ
2-CHLOROTOLUENE	ug/L		<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	<0.5 U	<2.5 U	<0.25 U
2-HEXANONE	ug/L		<125 UJ	<125 UJ	<1250 U	<2500 UJ	<5000 U	<100 U	<10 U	<50 U	<5 U
4-CHLOROTOLUENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L		<125 UJ	<125 UJ	<1250 U	<2500 U	<5000 U	<100 U	<10 U	<50 U	<5 U
ACETONE	ug/L		<125 U	<125 U	<1250 U	<2500 U	<5000 U	<100 U	<10 U	<50 U	<5 U
BENZENE	ug/L	5	20.5 J	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	2.77	<2.5 U	<0.25 U
BROMOBENZENE	ug/L		<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	<0.5 U	<2.5 U	<0.25 U
BROMOCHLOROMETHANE	ug/L		<10 U	<10 U	<100 U	<200 U	<400 U	<8 U	<0.8 U	<4 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	80	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
BROMOFORM	ug/L	80	<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 U	<10 U	<1 U
BROMOMETHANE	ug/L		<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 U	<10 U	<1 U
CARBON DISULFIDE	ug/L		<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 U	<10 U	<1 UJ
CARBON TETRACHLORIDE	ug/L	5	125	6.97 J	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	<0.5 U	<2.5 U	<0.25 U
CHLOROETHANE	ug/L		<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 U	<10 U	<1 UJ
CHLOROFORM	ug/L	80	71.1	18.5 J	45 J	98.3 J	<250 U	8.34 J	8.88	2.56 J	<0.25 U
CHLOROMETHANE	ug/L		<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 UJ	<10 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	64.3	339	16700	11400	11800	643	681	175	1
CIS-1,3-DICHLOROPROPENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	80	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
DIBROMOMETHANE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
ISOPROPYLBENZENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
m,p-Xylene	ug/L		<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 U	<10 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<12.5 U	<12.5 U	44100	174000	172000	6.1 J	0.658 J	2.65 J	<0.5 U
NAPHTHALENE	ug/L		<10 U	<10 U	<100 U	<200 U	<400 U	<8 U	<0.8 U	<4 U	<0.4 U
N-BUTYLBENZENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
N-PROPYLBENZENE	ug/L		<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	<0.5 U	<2.5 U	<0.25 U
O-XYLENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
STYRENE	ug/L	100	<6.25 U	<6.25 U	<62.5 U	<125 U	<250 U	<5 U	<0.5 U	<2.5 U	<0.25 U
TERT-BUTYLBENZENE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	5.56	<5 U	<0.5 U
TOLUENE	ug/L	1000	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	4.81	<5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		<25 U	<25 U	<250 U	<500 U	<1000 U	<20 U	<2 U	<10 U	<1 U
TRICHLOROETHENE	ug/L	5	20700	12600	51700	95400	99400	4690	5240	1430	6.71
TRICHLOROFLUOROMETHANE	ug/L		<12.5 U	<12.5 U	<125 U	<250 U	<500 U	<10 U	<1 U	<5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<12.5 U	8.92 J	628	305 J	295 J	9.58 J	12.2	5 J	0.42 J
Semi-Volatile Organic Compounds (8270D)											
HEXACHLOROBENZENE	ug/L	1	<0.5 U	<0.5 U	<0.5 UJ	<0.5 UJ	<0.5 UJ	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Chromium Trivalent (SM 3500-CR)											
Chromium, Trivalent	mg/L		<0.002 U	0.0045	<0.002 U	0.0203	0.00946	0.00714	0.00562	0.608	0.0242

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	MCL	ICT13E-021213 2/12/2013	ICT13F-021213 2/12/2013	ICT14A-021213 2/12/2013	ICT14B-021213 2/12/2013	ICT14C-021213 2/12/2013	ICT14D-021213 2/12/2013	ICT14D-021213-DUP 2/12/2013	ICT14E-021213 2/12/2013	ICT2-021213 2/12/2013
ID Location:			Site 18/24 – NNW, ouside the fence line, just along the perimeter road Sampled Annualy	Site 18/24 – N, outside the fence line, just along the perimeter road Sampled Annualy	Site 18/24 – N, inside the fence line, outter region Sampled Annualy	Site 18/24 – NE, inside the fence line, outter region Sampled Annualy	Site 18/24 – NE, inside the fence line, outter region Sampled Annualy	Site 18/24 – ENE, inside the fence line, outter region Sampled Annualy	Site 18/24 – ENE, inside the fence line, outter region Sampled Annualy	Site 18/24 – E, inside the fence line, outter region Sampled Annualy	Site 18/24 – W, inside the fence line, middle region Sampled Annualy
Metals (6010C and 6020A)											
ALUMINUM	mg/L		3.18	3.4	<0.1 U	<0.1 U	<0.1 U	<0.1 U	<0.1 U	0.086 J	<0.1 U
IRON	mg/L		4.02	3.75	0.127 J	0.37	4.1	4.3	4.33	11.1	7.61
SELENIUM	mg/L	0.05	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U	<0.01 U
ANTIMONY	mg/L	0.006	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
ARSENIC	mg/L	0.01	0.0021	0.00114 J	0.00119 J	0.00129 J	0.00721	0.00771	0.00679	0.00728	0.00318
BARIUM	mg/L	2	0.125	0.0615	0.161	0.459	2.13	1.54	1.38	3.33	0.192
CADMIUM	mg/L	0.005	<0.0006 U	<0.0006 U	0.00255	<0.0006 U	<0.0006 U	<0.0006 U	<0.0006 U	0.000902 J	<0.0006 U
CHROMIUM	mg/L		0.236	0.00622	0.0019 J	0.00654	0.006	0.0016 J	0.00206 J	0.0238	0.00387 J
COBALT	mg/L	0.015	0.00402	0.00483	0.00308	0.0119	0.0079	0.0249	0.0234	0.032	0.00942
LEAD	mg/L		0.00453	0.00144 J	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	0.000564 J	<0.001 U
MANGANESE	mg/L		0.0492	0.0189	0.0955	0.531	0.769	1.97	1.91	1.47	0.531
NICKEL	mg/L		0.022	0.0131	0.0129	0.0214	0.0097	0.0297	0.0276	0.0338	0.016
SILVER	mg/L	0.002	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U	<0.001 U
THALLIUM	mg/L		0.000335 J	0.000128 J	0.000218 J	0.000185 J	0.000101 J	<0.0002 U	<0.0002 U	<0.0002 U	<0.0002 U
VANADIUM	mg/L		0.000763 J	0.00377	<0.001 U	<0.001 U	0.00318	<0.001 U	<0.001 U	<0.001 U	<0.001 U
ZINC	mg/L		0.0301 J	0.0227 J	0.0144 J	0.0224 J	<0.025 U	0.0185 J	0.0162 J	0.0287 J	<0.025 U
Perchlorate (6850)											
PERCHLORATE	ug/L		1610	0.468	3170	12900	23600	3430	3610	14000	842
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/L		<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 UJ
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<20 U	<40 U	<40 U	<10 UJ	<0.4 UJ
1,1,2-TRICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,1-DICHLOROETHANE	ug/L		<0.25 U	<0.25 U	0.831 J	1.68	12.2 J	28.3 J	31.9 J	<6.25 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<1 U	<1 U	0.551 J	1.52 J	116	155 J	159 J	<25 U	0.956 J
1,1-DICHLOROPROPENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		<0.3 U	<0.3 U	<0.3 U	<0.3 U	<15 U	<30 U	<30 U	<7.5 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		<1 U	<1 U	<1 U	<1 U	<50 U	<100 U	<100 U	<25 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<20 U	<40 U	<40 U	<10 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<2 U	<2 U	<2 U	<2 U	<100 U	<200 U	<200 U	<50 UJ	<2 U
1,2-DIBROMOETHANE	ug/L	600	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	53.3 J	51.6 J	<12.5 U	9.45
1,2-DICHLOROPROPANE	ug/L	5	<0.4 U	<0.4 U	<0.4 U	<0.4 U	<20 U	<40 U	<40 U	<10 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<20 U	<40 U	<40 U	<10 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
2-BUTANONE	ug/L		<5 U	<5 U	<5 UJ	<5 UJ	<250 U	<500 U	<500 U	<125 UJ	<5 UJ
2-CHLOROTOLUENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
2-HEXANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<250 U	<500 U	<500 U	<125 UJ	<5 UJ
4-CHLOROTOLUENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L		<5 U	<5 U	<5 U	<5 U	<250 U	<500 U	<500 U	<125 UJ	<5 UJ
ACETONE	ug/L		<5 U	<5 U	<5 U	<5 U	<250 U	<500 U	<500 U	<125 U	<5 U
BENZENE	ug/L	5	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
BROMOBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
BROMOCHLOROMETHANE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<20 U	<40 U	<40 U	<10 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	80	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
BROMOFORM	ug/L	80	<1 U	<1 U	<1 U	<1 U	<50 U	<100 U	<100 U	<25 U	<1 U
BROMOMETHANE	ug/L		<1 U	<1 U	<1 U	<1 U	<50 U	<100 U	<100 U	<25 U	<1 U
CARBON DISULFIDE	ug/L		<1 U	<1 U	<1 UJ	<1 UJ	<50 U	<100 U	<100 U	<25 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
CHLOROBENZENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
CHLOROETHANE	ug/L		<1 U	<1 U	<1 UJ	<1 UJ	<50 U	<100 U	<100 U	<25 U	<1 U
CHLOROFORM	ug/L	80	<0.25 U	<0.25 U	0.329 J	0.749 J	32 J	42.8 J	37.2 J	5.02 J	<0.25 U
CHLOROMETHANE	ug/L		<1 UJ	<1 UJ	<1 U	<1 U	<50 U	<100 U	<100 U	<25 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	0.521 J	<0.5 U	8.23	19.2	4420	13200	13200	50.3	10
CIS-1,3-DICHLOROPROPENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	80	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
DIBROMOMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
ETHYLBENZENE	ug/L	700	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
ISOPROPYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
m,p-Xylene	ug/L		<1 U	<1 U	<1 U	<1 U	<50 U	<100 U	<100 U	<25 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	<0.5 U	502	19000	19300	<12.5 U	<0.5 U
NAPHTHALENE	ug/L		<0.4 U	<0.4 U	<0.4 U	<0.4 U	<20 U	<40 U	<40 U	<10 U	<0.4 U
N-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
N-PROPYLBENZENE	ug/L		<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
O-XYLENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
SEC-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
STYRENE	ug/L	100	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<12.5 U	<25 U	<25 U	<6.25 U	<0.25 U
TERT-BUTYLBENZENE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<0.5 U	<0.5 U	<0.5 U	0.372 J	<25 U	<50 U	<50 U	<12.5 U	0.523 J
TOLUENE	ug/L	1000	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<0.5 U	<0.5 U	<0.5 U	0.54 J	41.6 J	39.1 J	30.4 J	<12.5 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		<1 U	<1 U	<1 U	<1 U	<50 U	<100 U	<100 U	<25 U	<1 U
TRICHLOROETHENE	ug/L	5	2.97	<0.5 U	62.5	199	9710	8960	8330	4760	183
TRICHLOROFLUOROMETHANE	ug/L		<0.5 U	<0.5 U	<0.5 U	<0.5 U	<25 U	<50 U	<50 U	<12.5 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<0.5 U	<0.5 U	2.08	11	38.9 J	165 J	118 J	52.5	0.557 J
Semi-Volatile Organic Compounds (8270D)											
HEXACHLOROBENZENE	ug/L	1	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U
Chromium Trivalent (SM 3500-CR)											
Chromium, Trivalent	mg/L		0.236	0.00622	<0.002 U	0.00654	0.006	<0.002 U	<0.002 U	0.0238	0.004

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	MCL	ICT4-021213 2/12/2013	ICT7-021213 2/12/2013	ICT8-021213 2/12/2013	INF POND-030513 3/5/2013
ID Location:			Site 18/24 – SW, inside the fence line, middle region	Site 18/24 – N, inside the fence line, outter region	Site 18/24 – NE, inside the fence line, middle region	INF Pond - Collected by the discharge pipe at the northeast corner of the pond
Metals (6010C and 6020A)						
ALUMINUM	mg/L		<0.1 U	5.75	0.102 J	2.49
IRON	mg/L		<0.1 U	6.61	2.65	2.7
SELENIUM	mg/L	0.05	<0.01 U	<0.01 U	<0.01 U	<0.01 U
ANTIMONY	mg/L	0.006	<0.001 U	<0.001 U	<0.001 U	0.000509 J
ARSENIC	mg/L	0.01	0.0011 J	0.00165 J	0.00536	0.00261
BARIUM	mg/L	2	0.288	0.152	1.09	0.0407
CADMIUM	mg/L	0.005	0.00132	<0.0006 U	<0.0006 U	<0.0006 U
CHROMIUM	mg/L		0.00518	0.00503	0.00113 J	0.00188 J
COBALT	mg/L	0.015	0.0188	0.00585	0.00872	0.000915 J
LEAD	mg/L		<0.001 U	0.00125 J	<0.001 U	0.00112 J
MANGANESE	mg/L		0.914	0.232	0.616	0.0249
NICKEL	mg/L		0.0335	0.0101	0.0108	0.00228 J
SILVER	mg/L	0.002	<0.001 U	<0.001 U	<0.001 U	<0.001 U
THALLIUM	mg/L		<0.0002 U	0.000358 J	0.000168 J	0.000135 J
VANADIUM	mg/L		<0.001 U	0.00333	0.00101 J	0.00325
ZINC	mg/L		0.0234 J	0.0174 J	<0.025 U	0.0396 J
Perchlorate (6850)						
PERCHLORATE	ug/L		11700	450	562	<0.2 U
Hexavalent Chromium (7196A)						
HEXAVALENT CHROMIUM	mg/L		<0.01 UJ	<0.01 UJ	<0.01 UJ	<0.01 U
Volatile Organic Compounds (8260B)						
1,1,1,2-TETRACHLOROETHANE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
1,1,1-TRICHLOROETHANE	ug/L	200	<12.5 U	<0.5 U	<250 U	<0.5 U
1,1,2,2-TETRACHLOROETHANE	ug/L		<10 UJ	<0.4 UJ	<200 U	<0.4 U
1,1,2-TRICHLOROETHANE	ug/L	5	<12.5 U	<0.5 U	<250 U	<0.5 U
1,1-DICHLOROETHANE	ug/L		<6.25 U	<0.25 U	<125 U	<0.25 U
1,1-DICHLOROETHENE	ug/L	7	<25 U	<1 U	<500 U	<1 U
1,1-DICHLOROPROPENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
1,2,3-TRICHLOROBENZENE	ug/L		<7.5 U	<0.3 U	<150 U	<0.3 U
1,2,3-TRICHLOROPROPANE	ug/L		<25 U	<1 U	<500 U	<1 U
1,2,4-TRICHLOROBENZENE	ug/L	70	<10 U	<0.4 U	<200 U	<0.4 U
1,2,4-TRIMETHYLBENZENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
1,2-DIBROMO-3-CHLOROPROPANE	ug/L	0.2	<50 U	<2 U	<1000 U	<2 U
1,2-DIBROMOETHANE	ug/L	600	<12.5 U	<0.5 U	<250 U	<0.5 U
1,2-DICHLOROBENZENE	ug/L		<6.25 U	<0.25 U	<125 U	<0.25 U
1,2-DICHLOROETHANE	ug/L	5	118	<0.5 U	<250 U	<0.5 U
1,2-DICHLOROPROPANE	ug/L	5	<10 U	<0.4 U	<200 U	<0.4 U
1,3,5-TRIMETHYLBENZENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
1,3-DICHLOROBENZENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
1,3-DICHLOROPROPANE	ug/L		<10 U	<0.4 U	<200 U	<0.4 U
1,4-DICHLOROBENZENE	ug/L	75	<6.25 U	<0.25 U	<125 U	<0.25 U
2,2-DICHLOROPROPANE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
2-BUTANONE	ug/L		<125 UJ	<5 UJ	<2500 U	<5 U
2-CHLOROTOLUENE	ug/L		<6.25 U	<0.25 U	<125 U	<0.25 U
2-HEXANONE	ug/L		<125 UJ	<5 UJ	<2500 U	<5 U
4-CHLOROTOLUENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
4-METHYL-2-PENTANONE	ug/L		<125 UJ	<5 UJ	<2500 U	<5 U
ACETONE	ug/L		<125 U	<5 U	<2500 U	<5 U
BENZENE	ug/L	5	<6.25 U	<0.25 U	<125 U	<0.25 U
BROMOBENZENE	ug/L		<6.25 U	<0.25 U	<125 U	<0.25 U
BROMOCHLOROMETHANE	ug/L		<10 U	<0.4 U	<200 U	<0.4 U
BROMODICHLOROMETHANE	ug/L	80	<12.5 U	<0.5 U	<250 U	<0.5 U
BROMOFORM	ug/L	80	<25 U	<1 U	<500 U	<1 U
BROMOMETHANE	ug/L		<25 U	<1 U	<500 U	<1 U
CARBON DISULFIDE	ug/L		<25 U	<1 U	<500 U	<1 U
CARBON TETRACHLORIDE	ug/L	5	<12.5 U	<0.5 U	<250 U	<0.5 U
CHLOROBENZENE	ug/L	100	<6.25 U	<0.25 U	<125 U	<0.25 U
CHLOROETHANE	ug/L		<25 U	<1 U	<500 U	<1 U
CHLOROFORM	ug/L	80	7.89 J	<0.25 U	<125 U	<0.25 U
CHLOROMETHANE	ug/L		<25 U	<1 U	<500 U	<1 U
CIS-1,2-DICHLOROETHENE	ug/L	70	249	0.45 J	4080	<0.5 U
CIS-1,3-DICHLOROPROPENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
DIBROMOCHLOROMETHANE	ug/L	80	<12.5 U	<0.5 U	<250 U	<0.5 U
DIBROMOMETHANE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
DICHLORODIFLUOROMETHANE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
ETHYLBENZENE	ug/L	700	<12.5 U	<0.5 U	<250 U	<0.5 U
HEXACHLOROBUTADIENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
ISOPROPYLBENZENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
m,p-Xylene	ug/L		<25 U	<1 U	<500 U	<1 U
METHYLENE CHLORIDE	ug/L	5	<12.5 U	<0.5 U	45200	<0.5 U
NAPHTHALENE	ug/L		<10 U	<0.4 U	<200 U	<0.4 U
N-BUTYLBENZENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
N-PROPYLBENZENE	ug/L		<6.25 U	<0.25 U	<125 U	<0.25 U
O-XYLENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
P-ISOPROPYLTOLUENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
SEC-BUTYLBENZENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
STYRENE	ug/L	100	<6.25 U	<0.25 U	<125 U	<0.25 U
TERT-BUTYLBENZENE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
TETRACHLOROETHENE	ug/L	5	<12.5 U	<0.5 U	224 J	<0.5 U
TOLUENE	ug/L	1000	<12.5 U	<0.5 U	<250 U	<0.5 U
TRANS-1,2-DICHLOROETHENE	ug/L	100	<12.5 U	<0.5 U	<250 U	<0.5 U
TRANS-1,3-DICHLOROPROPENE	ug/L		<25 U	<1 U	<500 U	<1 U
TRICHLOROETHENE	ug/L	5	4670	1.97	6420	<0.5 U
TRICHLOROFLUOROMETHANE	ug/L		<12.5 U	<0.5 U	<250 U	<0.5 U
VINYL CHLORIDE	ug/L	2	<12.5 U	<0.5 U	<250 U	<0.5 U
Semi-Volatile Organic Compounds (8270D)						
HEXACHLOROBENZENE	ug/L	1	<0.5 U	<0.5 U	<0.5 U	NA
Chromium Trivalent (SM 3500-CR)						
Chromium, Trivalent	mg/L		0.00517	0.00503	<0.002 U	<0.005 U

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

MCL- Maximum Contamination Limit as determined by EPA Region 6 Guidelines

Blue highlighting indicates analyte detected above MCL.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18/24 STOCKPILE-040913 4/9/2013	18CPT01 (7-8') 2/26/2013	18CPT01 (15-16') 2/27/2013	18CPT01 (31-32') 2/27/2013	18CPT01 (40-40_5') 2/27/2013	18CPT02 (8-9) 280313 3/28/2013	18CPT02 (8-9) 280313 3/28/2013	18CPT02 (21-22) 280313 3/28/2013	18CPT02 (21-22) 280313 3/28/2013	18CPT02 (29-30) 280313 3/28/2013
ID Location:		IDW	Site 18/24 – NE, inside the fence line, middle region	Site 18/24 – NE, inside the fence line, middle region	Site 18/24 – NE, inside the fence line, middle region	Site 18/24 – NE, inside the fence line, middle region	Site 18/24 – ENE, inside the fence line, middle region	Site 18/24 – ENE, inside the fence line, middle region	Site 18/24 – ENE, inside the fence line, middle region	Site 18/24 – ENE, inside the fence line, middle region	Site 18/24 – ENE, inside the fence line, middle region
Metals (6010C and 6020A)											
IRON	mg/kg	8530	NA	NA	NA	NA	NA	6290	NA	8690	NA
SELENIUM	mg/kg	<0.825 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/kg	4.14	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/kg	77.1	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/kg	<0.115 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/kg	7.33	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/kg	7.01	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/kg	<0.231 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/kg	<2.33 U	6.29	1.24 J	1.36 J	5670	1.9 J	NA	5	NA	40
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/kg	<23.6 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (7471A)											
MERCURY	mg/kg	0.0223 J	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,1,1-TRICHLOROETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	6.71	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,1,2,2-TETRACHLOROETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,1,2-TRICHLOROETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	2.14 J	4.31 J	NA	<1.07 U	NA	<1.07 U	NA
1,1-DICHLOROETHANE	ug/kg	<2.19 U	<2.09 U	<2.16 U	12.8	31 J	NA	<2.14 U	NA	<2.15 U	NA
1,1-DICHLOROETHENE	ug/kg	<1.1 U	<1.05 U	5.5	106	542 J	NA	<1.07 U	NA	12.9	NA
1,1-DICHLOROPROPENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,2,3-TRICHLOROBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,2,3-TRICHLOROPROPANE	ug/kg	<2.19 U	<2.09 U	<2.16 U	<1.92 U	<2.01 U	NA	<2.14 U	NA	<2.15 U	NA
1,2,4-TRICHLOROBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,2,4-TRIMETHYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	2.13 J	0.508 J	NA	<1.07 U	NA	<1.07 U	NA
1,2-DIBROMO-3-CHLOROPROP/	ug/kg	<4.39 U	<4.19 U	<4.32 U	<3.84 U	<4.03 U	NA	<4.27 U	NA	<4.29 U	NA
1,2-DIBROMOETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,2-DICHLOROBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,2-DICHLOROETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	1.97 J	NA	<1.07 U	NA	9.73	NA
1,2-DICHLOROPROPANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,3,5-TRIMETHYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,3-DICHLOROBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,3-DICHLOROPROPANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
1,4-DICHLOROBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
2,2-DICHLOROPROPANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
2-BUTANONE	ug/kg	<5.48 U	<5.24 U	<5.39 U	<4.8 U	11.3 J	NA	<5.34 U	NA	<5.37 U	NA
2-CHLOROTOLUENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
2-HEXANONE	ug/kg	<5.48 U	<5.24 U	<5.39 U	<4.8 U	<5.03 U	NA	<5.34 U	NA	<5.37 U	NA
4-CHLOROTOLUENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
4-METHYL-2-PENTANONE	ug/kg	<5.48 U	<5.24 U	<5.39 U	<4.8 U	<5.03 U	NA	<5.34 U	NA	<5.37 U	NA
ACETONE	ug/kg	<11 U	<10.5 U	<10.8 U	<9.6 U	<10.1 U	NA	9.33 J	NA	<10.7 U	NA
BENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	1.14 J	NA	<1.07 U	NA	<1.07 U	NA
BROMOBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
BROMOCHLOROMETHANE	ug/kg	<2.19 U	<2.09 U	<2.16 U	<1.92 U	23.4 J	NA	<2.14 U	NA	<2.15 U	NA
BROMODICHLOROMETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
BROMOFORM	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
BROMOMETHANE	ug/kg	<2.19 U	<2.09 U	<2.16 U	<1.92 U	<2.01 U	NA	<2.14 U	NA	<2.15 U	NA
CARBON DISULFIDE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
CARBON TETRACHLORIDE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
CHLOROBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
CHLOROETHANE	ug/kg	<2.19 U	<2.09 U	<2.16 U	<1.92 U	<2.01 U	NA	<2.14 U	NA	<2.15 U	NA
CHLOROFORM	ug/kg	<1.1 U	<1.05 U	<1.08 U	13.7	122 J	NA	<1.07 U	NA	0.962 J	NA
CHLOROMETHANE	ug/kg	<4.39 U	<4.19 U	<4.32 U	<3.84 U	<4.03 U	NA	<4.27 U	NA	<4.29 U	NA
CIS-1,2-DICHLOROETHENE	ug/kg	<1.1 U	<1.05 U	1.69 J	27100	391 J	NA	<1.07 U	NA	38.5	NA
CIS-1,3-DICHLOROPROPENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
DIBROMOCHLOROMETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
DIBROMOMETHANE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
DICHLORODIFLUOROMETHANE	ug/kg	<2.19 U	<2.09 U	<2.16 U	<1.92 U	<2.01 U	NA	<2.14 U	NA	<2.15 U	NA
ETHYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	23.9	6.64	NA	<1.07 U	NA	<1.07 U	NA
HEXACHLOROBUTADIENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
ISOPROPYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	0.533 J	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
m,p-Xylene	ug/kg	<1.1 U	<1.05 U	<1.08 U	5.71	3.13 J	NA	<1.07 U	NA	<1.07 U	NA
METHYLENE CHLORIDE	ug/kg	<2.19 U	4.06 J	<2.16 U	135	657000	NA	1.24 J	NA	<2.15 U	NA
NAPHTHALENE	ug/kg	<1.1 U	<1.05 U	0.589 J	2.08 J	0.521 J	NA	<1.07 U	NA	<1.07 U	NA
N-BUTYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
N-PROPYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
O-XYLENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	3.2 J	1.52 J	NA	<1.07 U	NA	<1.07 U	NA
P-ISOPROPYLTOLUENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
SEC-BUTYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
STYRENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	59.7	4.05 J	NA	<1.07 U	NA	<1.07 U	NA
TERT-BUTYLBENZENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
TETRACHLOROETHENE	ug/kg	<1.1 U	<1.05 U	1.24 J	18.1	7.65	NA	<1.07 U	NA	0.933 J	NA
TOLUENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	8.29	4.36 J	NA	<1.07 U	NA	<1.07 U	NA
TRANS-1,2-DICHLOROETHENE	ug/kg	<1.1 U	<1.05 U	<1.08 U	18.2	121 J	NA	<1.07 U	NA	1.03 J	NA
TRANS-1,3-DICHLOROPROPEN	ug/kg	<1.1 U	<1.05 U	<1.08 U	<0.96 U	<1.01 U	NA	<1.07 U	NA	<1.07 U	NA
TRICHLOROETHENE	ug/kg	<1.1 U	<1.05 U	95.6	197	41400	NA	2.4 J	NA	3000	NA
TRICHLOROFLUOROMETHANE	ug/kg	<2.19 U	<2.09 U	<2.16 U	<1.92 U	<2.01 U	NA	<2.14 U	NA	<2.15 U	NA
VINYL CHLORIDE	ug/kg	<2.19 U	<2.09 U	<2.16 U	6.93	43.7 J	NA	<2.14 U	NA	13.8	NA
Sulfide (9034)											
SULFIDE	mg/kg	<59.7 U	NA	NA	NA	NA	NA	<64.3 U	NA	<63.5 U	NA
pH (9045D)											
PH	PH	5.4	5.12	5.92	5.1	5.16	NA	6.54	NA	7.22	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT02 (29-30) 280313 3/28/2013	18CPT02 (41-42) 280313 3/28/2013	18CPT02 (41-42) 280313 3/28/2013	18CPT-03 10-11 3/11/2013	18CPT-03 21-22 3/11/2013	18CPT-03 34-35 3/11/2013	18CPT-03 43-44 3/11/2013	18CPT05 (15-16) 010413 4/1/2013	18CPT05 (25-26) 010413 4/1/2013
ID Location:		Site 18/24 – ENE, inside the fence line, middle region	Site 18/24 – ENE, inside the fence line, middle region	Site 18/24 – ENE, inside the fence line, middle region	Site 18/24 – SE, inside the fence line, central region	Site 18/24 – SE, inside the fence line, central region	Site 18/24 – SE, inside the fence line, central region	Site 18/24 – SE, inside the fence line, central region	Site 18/24 – NW, inside the fence line, middle region	Site 18/24 – NW, inside the fence line, middle region
Metals (6010C and 6020A)										
IRON	mg/kg	13800	NA	13200	6420	17600	6380	8120	NA	NA
SELENIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)										
PERCHLORATE	ug/kg	NA	1.5 J	NA	2.44 J	3.49 J	7270	70800	1.7 J	13000
Hexavalent Chromium (7196A)										
HEXAVALENT CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (7471A)										
MERCURY	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)										
1,1,1,2-TETRACHLOROETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,1,1-TRICHLOROETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,1,2,2-TETRACHLOROETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,1,2-TRICHLOROETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,1-DICHLOROETHANE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
1,1-DICHLOROETHENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,1-DICHLOROPROPENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,2,3-TRICHLOROBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,2,3-TRICHLOROPROPANE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
1,2,4-TRICHLOROBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,2,4-TRIMETHYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,2-DIBROMO-3-CHLOROPROP/	ug/kg	<460 U	NA	<465 U	<3.99 U	<4.44 U	<442 U	<419 U	NA	NA
1,2-DIBROMOETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,2-DICHLOROBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,2-DICHLOROETHANE	ug/kg	253 J	NA	<116 U	<0.997 U	<1.11 U	64.4 J	<105 U	NA	NA
1,2-DICHLOROPROPANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,3,5-TRIMETHYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,3-DICHLOROBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,3-DICHLOROPROPANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
1,4-DICHLOROBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
2,2-DICHLOROPROPANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
2-BUTANONE	ug/kg	<576 U	NA	<581 U	<4.98 U	2.88 J	<553 UJ	<524 UJ	NA	NA
2-CHLOROTOLUENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
2-HEXANONE	ug/kg	<576 U	NA	<581 U	<4.98 U	<5.55 U	<553 U	<524 U	NA	NA
4-CHLOROTOLUENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
4-METHYL-2-PENTANONE	ug/kg	<576 U	NA	<581 U	<4.98 U	<5.55 U	<553 UJ	<524 UJ	NA	NA
ACETONE	ug/kg	<1150 U	NA	<1160 U	<9.97 U	16.1 J	<1110 U	<1050 U	NA	NA
BENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
BROMOBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
BROMOCHLOROMETHANE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
BROMODICHLOROMETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
BROMOFORM	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
BROMOMETHANE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
CARBON DISULFIDE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
CARBON TETRACHLORIDE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
CHLOROBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
CHLOROETHANE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
CHLOROFORM	ug/kg	<115 U	NA	<116 U	<0.997 U	1.25 J	<111 U	<105 U	NA	NA
CHLOROMETHANE	ug/kg	<460 U	NA	<465 U	<3.99 U	<4.44 U	<442 U	<419 U	NA	NA
CIS-1,2-DICHLOROETHENE	ug/kg	107 J	NA	2050	<0.997 U	<1.11 U	93 J	<105 U	NA	NA
CIS-1,3-DICHLOROPROPENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
DIBROMOCHLOROMETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
DIBROMOMETHANE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
DICHLORODIFLUOROMETHANE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
ETHYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
HEXACHLOROBUTADIENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
ISOPROPYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
m,p-Xylene	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
METHYLENE CHLORIDE	ug/kg	<230 U	NA	7150	<1.99 U	1.43 J	<221 U	<209 U	NA	NA
NAPHTHALENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
N-BUTYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
N-PROPYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
O-XYLENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
P-ISOPROPYLTOLUENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
SEC-BUTYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
STYRENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
TERT-BUTYLBENZENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
TETRACHLOROETHENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
TOLUENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
TRANS-1,2-DICHLOROETHENE	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
TRANS-1,3-DICHLOROPROPEN	ug/kg	<115 U	NA	<116 U	<0.997 U	<1.11 U	<111 U	<105 U	NA	NA
TRICHLOROETHENE	ug/kg	3130	NA	338 J	<0.997 U	22.7	2320	365 J	NA	NA
TRICHLOROFLUOROMETHANE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
VINYL CHLORIDE	ug/kg	<230 U	NA	<233 U	<1.99 U	<2.22 U	<221 U	<209 U	NA	NA
Sulfide (9034)										
SULFIDE	mg/kg	<61 U	NA	40.1 J	<61.5 U	<64.2 U	<60 U	<62.4 U	NA	NA
pH (9045D)										
PH	PH	6.77	NA	5.87	7.01	6.83	7.95	7.39	NA	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT05 (31-32) 010413 4/1/2013	18CPT05 (39-40) 010413 4/1/2013	18CPT06 (9-10') 3/7/2013	DUP-02 3/7/2013	18CPT06 (19-20') 3/8/2013	18CPT06 (38-39') 3/8/2013	18CPT06 (43-44') 3/8/2013	18CPT07 (7-8)-120313 3/12/2013	18CPT07 (17-18)-120313 3/12/2013	18CPT07 (29-30)-120313 3/12/2013
ID Location:		Site 18/24 – NW, inside the fence line, middle region	Site 18/24 – NW, inside the fence line, middle region	Site 18/24 – ESE, insdie the fence line, middle region	Site 18/24 – ESE, 18CPT06 (9-10'), insdie the fence line, middle region	Site 18/24 – ESE, insdie the fence line, middle region	Site 18/24 – ESE, insdie the fence line, middle region	Site 18/24 – ESE, insdie the fence line, middle region	Site 18/24 – ENE, inside the fence line, outter region	Site 18/24 – ENE, inside the fence line, outter region	Site 18/24 – ENE, inside the fence line, outter region
Metals (6010C and 6020A)											
IRON	mg/kg	NA	NA	8510	7610	8130	7610	2830	9540	15900	7440
SELENIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/kg	3300	140	<2.46 U	<2.5 U	331	824	15.5	19.6	669	3780
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (7471A)											
MERCURY	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,1,1-TRICHLOROETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,1,2,2-TETRACHLOROETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,1,2-TRICHLOROETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,1-DICHLOROETHANE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
1,1-DICHLOROETHENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	0.737 J	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,1-DICHLOROPROPENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,2,3-TRICHLOROBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,2,3-TRICHLOROPROPANE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
1,2,4-TRICHLOROBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,2,4-TRIMETHYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,2-DIBROMO-3-CHLOROPROPA	ug/kg	NA	NA	<4.47 U	<4.22 U	<4.11 U	<3.77 U	<4.23 U	<4.6 U	<4.83 U	<395 U
1,2-DIBROMOETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,2-DICHLOROBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,2-DICHLOROETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	0.928 J	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,2-DICHLOROPROPANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,3,5-TRIMETHYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,3-DICHLOROBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,3-DICHLOROPROPANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
1,4-DICHLOROBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
2,2-DICHLOROPROPANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
2-BUTANONE	ug/kg	NA	NA	<5.58 U	<5.28 U	<5.14 U	<4.72 U	<5.28 U	<5.75 U	<6.04 U	<494 UJ
2-CHLOROTOLUENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
2-HEXANONE	ug/kg	NA	NA	<5.58 U	<5.28 U	<5.14 U	<4.72 U	<5.28 U	<5.75 U	<6.04 U	<494 U
4-CHLOROTOLUENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
4-METHYL-2-PENTANONE	ug/kg	NA	NA	<5.58 U	<5.28 U	<5.14 U	<4.72 U	<5.28 U	<5.75 U	<6.04 U	<494 UJ
ACETONE	ug/kg	NA	NA	<11.2 U	<10.6 U	<10.3 U	<9.43 U	<10.6 U	<11.5 U	<12.1 U	<988 U
BENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	1.43 J	<1.06 U	<1.15 U	<1.21 U	<98.8 U
BROMOBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
BROMOCHLOROMETHANE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
BROMODICHLOROMETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
BROMOFORM	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
BROMOMETHANE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
CARBON DISULFIDE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
CARBON TETRACHLORIDE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
CHLOROBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
CHLOROETHANE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
CHLOROFORM	ug/kg	NA	NA	<1.12 U	<1.06 U	1.1 J	2.01 J	<1.06 U	<1.15 U	<1.21 U	<98.8 U
CHLOROMETHANE	ug/kg	NA	NA	<4.47 U	<4.22 U	<4.11 U	<3.77 U	<4.23 U	<4.6 U	<4.83 U	<395 U
CIS-1,2-DICHLOROETHENE	ug/kg	NA	NA	<1.12 U	<1.06 U	7.37	1.82 J	<1.06 U	<1.15 U	<1.21 U	<98.8 U
CIS-1,3-DICHLOROPROPENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
DIBROMOCHLOROMETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
DIBROMOMETHANE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
DICHLORODIFLUOROMETHANE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
ETHYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
HEXACHLOROBUTADIENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
ISOPROPYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
m,p-Xylene	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
METHYLENE CHLORIDE	ug/kg	NA	NA	<2.23 U	1.94 J	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
NAPHTHALENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
N-BUTYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
N-PROPYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
O-XYLENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
P-ISOPROPYLTOLUENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
SEC-BUTYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
STYRENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
TERT-BUTYLBENZENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
TETRACHLOROETHENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
TOLUENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
TRANS-1,2-DICHLOROETHENE	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
TRANS-1,3-DICHLOROPROPEN	ug/kg	NA	NA	<1.12 U	<1.06 U	<1.03 U	<0.943 U	<1.06 U	<1.15 U	<1.21 U	<98.8 U
TRICHLOROETHENE	ug/kg	NA	NA	16.3	14.8	106	219	<1.06 U	1.66 J	1.13 J	368 J
TRICHLOROFLUOROMETHANE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
VINYL CHLORIDE	ug/kg	NA	NA	<2.23 U	<2.11 U	<2.06 U	<1.89 U	<2.11 U	<2.3 U	<2.42 U	<198 U
Sulfide (9034)											
SULFIDE	mg/kg	NA	NA	<62.8 U	<63 U	<58.9 U	<62 U	<63.6 U	<56.7 U	<54.4 U	<60.9 U
pH (9045D)											
PH	PH	NA	NA	5.7	5.62	6.4	5.93	5.3	6.35	5.76	7.05

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT07 (29-30)- 120313MD 3/12/2013	18CPT07 (29-30)- 120313MS 3/12/2013	18CPT07 (37-38)- 120313 3/12/2013	18CPT07 (37-38)- 120313D 3/12/2013	18CPT08 (6-7') 2/28/2013	18CPT08 (37_5'-38') 3/1/2013	18CPT09 (6-7) 010413 4/1/2013	18CPT09 (12-13) 010413 4/1/2013	18CPT09 (16-17) 010413 4/1/2013	18CPT09 (21-22) 010413 4/1/2013
ID Location:		Site 18/24 – ENE, inside the fence line, outter region	Site 18/24 – ENE, inside the fence line, outter region	Site 18/24 – ENE, inside the fence line, outter region	Site 18/24 – ENE, inside the fence line, outter region	Site 18/24 – N, inside the fence line, outter region	Site 18/24 – N, inside the fence line, outter region	Site 18/24 – W, outside the fence line, at the beginning of the outter road loop	Site 18/24 – W, outside the fence line, at the beginning of the outter road loop	Site 18/24 – W, outside the fence line, at the beginning of the outter road loop	Site 18/24 – W, outside the fence line, at the beginning of the outter road loop
Metals (6010C and 6020A)											
IRON	mg/kg	7160	6850	13500	13200	NA	NA	NA	NA	NA	NA
SELENIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/kg	3980	3930	6080	6660	2.05 J	7060	2500	490	470	<1.3 U
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (7471A)											
MERCURY	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/kg	5220	2400	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,1,1-TRICHLOROETHANE	ug/kg	4910	2360	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,1,2,2-TETRACHLOROETHANE	ug/kg	4860	2190	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,1,2-TRICHLOROETHANE	ug/kg	4970	2410	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,1-DICHLOROETHANE	ug/kg	4190	2010	<218 U	<218 U	<2.05 U	<2.01 U	NA	NA	NA	NA
1,1-DICHLOROETHENE	ug/kg	4260	2080	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,1-DICHLOROPROPENE	ug/kg	4360	2130	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,2,3-TRICHLOROBENZENE	ug/kg	4230	2010	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,2,3-TRICHLOROPROPANE	ug/kg	5040	2190	<218 U	<218 U	<2.05 U	<2.01 U	NA	NA	NA	NA
1,2,4-TRICHLOROBENZENE	ug/kg	4310	2040	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,2,4-TRIMETHYLBENZENE	ug/kg	4560	2130	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,2-DIBROMO-3-CHLOROPROPA	ug/kg	5140	2430	<435 U	<435 U	<4.1 U	<4.02 U	NA	NA	NA	NA
1,2-DIBROMOETHANE	ug/kg	4530	2200	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,2-DICHLOROBENZENE	ug/kg	3930	1840	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,2-DICHLOROETHANE	ug/kg	5120	2460	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,2-DICHLOROPROPANE	ug/kg	4110	1940	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,3,5-TRIMETHYLBENZENE	ug/kg	4510	2130	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,3-DICHLOROBENZENE	ug/kg	3970	1820	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,3-DICHLOROPROPANE	ug/kg	5030	2410	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
1,4-DICHLOROBENZENE	ug/kg	4320	1990	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
2,2-DICHLOROPROPANE	ug/kg	4730	2300	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
2-BUTANONE	ug/kg	4280	2000	<544 UJ	<544 UJ	<5.12 U	<5.03 U	NA	NA	NA	NA
2-CHLOROTOLUENE	ug/kg	4030	2050	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
2-HEXANONE	ug/kg	4800	2120	<544 U	<544 U	<5.12 U	<5.03 U	NA	NA	NA	NA
4-CHLOROTOLUENE	ug/kg	4640	2020	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
4-METHYL-2-PENTANONE	ug/kg	4180	2030	<544 UJ	<544 UJ	<5.12 U	<5.03 U	NA	NA	NA	NA
ACETONE	ug/kg	3910 J	1840 J	<1090 U	<1090 U	<10.2 U	<10.1 U	NA	NA	NA	NA
BENZENE	ug/kg	4180	1980	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
BROMOBENZENE	ug/kg	4130	1960	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
BROMOCHLOROMETHANE	ug/kg	4150	1960	<218 U	<218 U	<2.05 U	<2.01 U	NA	NA	NA	NA
BROMODICHLOROMETHANE	ug/kg	4740	2200	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
BROMOFORM	ug/kg	4710	2230	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
BROMOMETHANE	ug/kg	3540	1620	<218 U	<218 U	<2.05 U	<2.01 U	NA	NA	NA	NA
CARBON DISULFIDE	ug/kg	4210	2090	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
CARBON TETRACHLORIDE	ug/kg	4710	2320	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
CHLOROBENZENE	ug/kg	4140	1960	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
CHLOROETHANE	ug/kg	4630	2100	<218 U	<218 U	<2.05 U	<2.01 U	NA	NA	NA	NA
CHLOROFORM	ug/kg	4650	2270	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
CHLOROMETHANE	ug/kg	4620	2180	<435 U	<435 U	<4.1 U	<4.02 U	NA	NA	NA	NA
CIS-1,2-DICHLOROETHENE	ug/kg	4490	2140	<109 U	<109 U	<1.02 U	2.44 J	NA	NA	NA	NA
CIS-1,3-DICHLOROPROPENE	ug/kg	4820	2280	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
DIBROMOCHLOROMETHANE	ug/kg	4730	2300	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
DIBROMOMETHANE	ug/kg	4850	2260	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
DICHLORODIFLUOROMETHANE	ug/kg	9130	4400	<218 U	<218 U	<2.05 U	<2.01 U	NA	NA	NA	NA
ETHYLBENZENE	ug/kg	4430	2080	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
HEXACHLOROBUTADIENE	ug/kg	4470	2080	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
ISOPROPYLBENZENE	ug/kg	4290	2020	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
m,p-Xylene	ug/kg	8650	4130	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
METHYLENE CHLORIDE	ug/kg	4160	1980	<218 U	<218 U	1.92 J	2.85 J	NA	NA	NA	NA
NAPHTHALENE	ug/kg	4220	1950	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
N-BUTYLBENZENE	ug/kg	5060	2430	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
N-PROPYLBENZENE	ug/kg	4310	2070	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
O-XYLENE	ug/kg	4180	1950	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
P-ISOPROPYLTOLUENE	ug/kg	4180	1980	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
SEC-BUTYLBENZENE	ug/kg	4130	1990	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
STYRENE	ug/kg	4450	2110	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
TERT-BUTYLBENZENE	ug/kg	4250	1940	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
TETRACHLOROETHENE	ug/kg	4290	2060	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
TOLUENE	ug/kg	4520	2190	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
TRANS-1,2-DICHLOROETHENE	ug/kg	4390	2060	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
TRANS-1,3-DICHLOROPROPEN	ug/kg	5210	2430	<109 U	<109 U	<1.02 U	<1.01 U	NA	NA	NA	NA
TRICHLOROETHENE	ug/kg	5310	2370	369 J	371 J	<1.02 U	11.8	NA	NA	NA	NA
TRICHLOROFLUOROMETHANE	ug/kg	5320	2570	<218 U	<218 U	<2.05 U	<2.01 U	NA	NA	NA	NA
VINYL CHLORIDE	ug/kg	4540	2180	<218 U	<218 U	<2.05 U	1.9 J	NA	NA	NA	NA
Sulfide (9034)											
SULFIDE	mg/kg	1400	1350	<62 U	<62.6 U	NA	NA	NA	NA	NA	NA
pH (9045D)											
PH	PH	7.26	7.23	6.88	7.05	5.04	5.17	NA	NA	NA	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT10 (17-18') 3/4/2013	18CPT10 (19-20') 3/4/2013	DUP-01 3/4/2013	18CPT10 (27-27_5') 3/4/2013	18CPT10 (28-29') 3/4/2013	18CPT12 (13-14') 3/5/2013	18CPT12 (18-19') 3/5/2013	18CPT12 (22-23') 3/5/2013	18CPT12 (28-29') 3/5/2013	18CPT13 (18-19') 3/8/2013
ID Location:		Site 18/24 – WSW, outside the fence line, just along the perimeter road	Site 18/24 – WSW, outside the fence line, just along the perimeter road	Site 18/24 – WSW, 18CPT10 (19-20'), outside the fence line, just along the perimeter road	Site 18/24 – WSW, outside the fence line, just along the perimeter road	Site 18/24 – WSW, outside the fence line, just along the perimeter road	Site 18/24 – SSW, outside the fence line, just along the perimeter road	Site 18/24 – SSW, outside the fence line, just along the perimeter road	Site 18/24 – SSW, outside the fence line, just along the perimeter road	Site 18/24 – SSW, outside the fence line, just along the perimeter road	Site 18/24 – SSE, outside the fence line, to the left of the road heading into site 18/24
Metals (6010C and 6020A)											
IRON	mg/kg	8710	10500	10800	11800	4910	14800	1210	6170	8070	10000
SELENIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/kg	4430	3350	3230	84200	127000	29.2	3730	6480	8830	1030
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (7471A)											
MERCURY	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,1,1-TRICHLOROETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,1,2,2-TETRACHLOROETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,1,2-TRICHLOROETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	1.35 J	1.38 J	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,1-DICHLOROETHANE	ug/kg	1.19 J	1.84 J	<1.96 U	<2.01 U	<1.89 U	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
1,1-DICHLOROETHENE	ug/kg	3.36 J	3.31 J	0.832 J	2.87 J	3.75 J	<1.21 U	1.12 J	4.14 J	2.71 J	<1.02 U
1,1-DICHLOROPROPENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,2,3-TRICHLOROBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,2,3-TRICHLOROPROPANE	ug/kg	<1.96 U	<2.33 U	<1.96 U	<2.01 U	<1.89 U	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
1,2,4-TRICHLOROBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,2,4-TRIMETHYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,2-DIBROMO-3-CHLOROPROPA	ug/kg	<3.92 U	<4.66 U	<3.92 U	<4.01 U	<3.78 U	<4.84 U	<4.26 U	<3.61 U	<3.87 U	<4.06 U
1,2-DIBROMOETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,2-DICHLOROBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,2-DICHLOROETHANE	ug/kg	6.29	1.84 J	1.4 J	2.06 J	0.841 J	<1.21 U	1.13 J	3.22 J	2.26 J	<1.02 U
1,2-DICHLOROPROPANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,3,5-TRIMETHYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,3-DICHLOROBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,3-DICHLOROPROPANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
1,4-DICHLOROBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
2,2-DICHLOROPROPANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
2-BUTANONE	ug/kg	<4.9 U	<5.82 U	<4.9 U	<5.02 U	<4.72 U	<6.04 U	<5.32 U	<4.51 U	<4.84 U	<5.08 U
2-CHLOROTOLUENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
2-HEXANONE	ug/kg	<4.9 U	<5.82 U	<4.9 U	<5.02 U	<4.72 U	<6.04 U	<5.32 U	<4.51 U	<4.84 U	<5.08 U
4-CHLOROTOLUENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
4-METHYL-2-PENTANONE	ug/kg	<4.9 U	<5.82 U	<4.9 U	<5.02 U	<4.72 U	<6.04 U	<5.32 U	<4.51 U	<4.84 U	<5.08 U
ACETONE	ug/kg	<9.8 U	<11.6 U	<9.8 U	<10 U	<9.45 U	<12.1 U	<10.6 U	<9.02 U	<9.68 U	<10.2 U
BENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	0.609 J	<1.21 U	<1.06 U	1.73 J	1.79 J	<1.02 U
BROMOBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
BROMOCHLOROMETHANE	ug/kg	<1.96 U	<2.33 U	<1.96 U	<2.01 U	<1.89 U	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
BROMODICHLOROMETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
BROMOFORM	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
BROMOMETHANE	ug/kg	<1.96 U	<2.33 U	<1.96 U	<2.01 U	<1.89 U	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
CARBON DISULFIDE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
CARBON TETRACHLORIDE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	2.75 J	2.52 J	<1.02 U
CHLOROBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
CHLOROETHANE	ug/kg	<1.96 U	<2.33 U	<1.96 U	<2.01 U	<1.89 U	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
CHLOROFORM	ug/kg	1.69 J	0.998 J	0.69 J	6.65	8.44	0.614 J	1.91 J	2.44 J	2.4 J	<1.02 U
CHLOROMETHANE	ug/kg	<3.92 U	<4.66 U	<3.92 U	<4.01 U	<3.78 U	<4.84 U	<4.26 U	<3.61 U	<3.87 U	<4.06 U
CIS-1,2-DICHLOROETHENE	ug/kg	20.7	32.4	15.8	17	16.6	1.63 J	2.74 J	2.18 J	2.47 J	<1.02 U
CIS-1,3-DICHLOROPROPENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
DIBROMOCHLOROMETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
DIBROMOMETHANE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
DICHLORODIFLUOROMETHANE	ug/kg	<1.96 UJ	<2.33 UJ	<1.96 U	<2.01 UJ	<1.89 UJ	<2.42 U	<2.13 UJ	<1.8 UJ	<1.94 U	<2.03 U
ETHYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
HEXACHLOROBUTADIENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
ISOPROPYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
m,p-Xylene	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
METHYLENE CHLORIDE	ug/kg	<1.96 U	<2.33 U	<1.96 U	1.59 J	2.62 J	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
NAPHTHALENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
N-BUTYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
N-PROPYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
O-XYLENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
P-ISOPROPYLTOLUENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
SEC-BUTYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
STYRENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
TERT-BUTYLBENZENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
TETRACHLOROETHENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
TOLUENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
TRANS-1,2-DICHLOROETHENE	ug/kg	<0.98 U	<1.16 U	<0.98 U	0.956 J	1.68 J	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
TRANS-1,3-DICHLOROPROPEN	ug/kg	<0.98 U	<1.16 U	<0.98 U	<1 U	<0.945 U	<1.21 U	<1.06 U	<0.902 U	<0.968 U	<1.02 U
TRICHLOROETHENE	ug/kg	5500	3140	3740	10300	25900	44.7	267	3820	1380	<1.02 U
TRICHLOROFLUOROMETHANE	ug/kg	<1.96 U	<2.33 U	<1.96 U	<2.01 U	<1.89 U	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
VINYL CHLORIDE	ug/kg	<1.96 U	<2.33 U	<1.96 U	<2.01 U	<1.89 U	<2.42 U	<2.13 U	<1.8 U	<1.94 U	<2.03 U
Sulfide (9034)											
SULFIDE	mg/kg	<61.9 U	<64 U	<64.3 U	<60 U	<61.2 U	<58 U	<61.6 U	<60 U	<61.1 U	<57 U
pH (9045D)											
PH	PH	6.47	6.14	6.4	6.61	7.25	7.52	7.39	7.16	5.88	5.31

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT13 (27_5-28_5') 3/8/2013	18CPT13 (35-36') 3/8/2013	18CPT13 (43-44') 3/8/2013	18CPT20 (7-8) 290313 3/29/2013	18CPT20 (7-8) 290313 3/29/2013	18CPT20 (16-17) 290313 3/29/2013	18CPT20 (16-17) 290313 3/29/2013	18CPT20 (32-33) 290313 3/29/2013	18CPT20 (32-33) 290313 3/29/2013	18CPT21 (16-17) 280313 3/28/2013
ID Location:		Site 18/24 – SSE, outside the fence line, to the left of the road heading into site 18/24	Site 18/24 – SSE, outside the fence line, to the left of the road heading into site 18/24	Site 18/24 – SSE, outside the fence line, to the left of the road heading into site 18/24	Site 18/24 – W, inside the fence line, outter region	Site 18/24 – W, inside the fence line, outter region	Site 18/24 – W, inside the fence line, outter region	Site 18/24 – W, inside the fence line, outter region	Site 18/24 – W, inside the fence line, outter region	Site 18/24 – W, inside the fence line, outter region	Site 18/24 – NNE, inside the fence line, middle region
Metals (6010C and 6020A)											
IRON	mg/kg	3880	2440	4150	NA	17600	NA	1150	NA	6880	NA
SELENIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
ARSENIC	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
BARIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CADMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LEAD	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SILVER	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/kg	5400	6620	4650	16	NA	9000	NA	19000	NA	8.4
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury (7471A)											
MERCURY	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,1,1-TRICHLOROETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,1,2,2-TETRACHLOROETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,1,2-TRICHLOROETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,1-DICHLOROETHANE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
1,1-DICHLOROETHENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	108 J	NA	<108 U	NA
1,1-DICHLOROPROPENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,2,3-TRICHLOROBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,2,3-TRICHLOROPROPANE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
1,2,4-TRICHLOROBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,2,4-TRIMETHYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,2-DIBROMO-3-CHLOROPROPA	ug/kg	<4.35 U	<3.77 U	<3.8 U	NA	<420 U	NA	<493 U	NA	<434 U	NA
1,2-DIBROMOETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,2-DICHLOROBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,2-DICHLOROETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,2-DICHLOROPROPANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,3,5-TRIMETHYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,3-DICHLOROBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,3-DICHLOROPROPANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
1,4-DICHLOROBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
2,2-DICHLOROPROPANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
2-BUTANONE	ug/kg	<5.44 U	<4.71 U	<4.75 U	NA	<526 U	NA	<616 U	NA	<542 U	NA
2-CHLOROTOLUENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
2-HEXANONE	ug/kg	<5.44 U	<4.71 U	<4.75 U	NA	<526 U	NA	<616 U	NA	<542 U	NA
4-CHLOROTOLUENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
4-METHYL-2-PENTANONE	ug/kg	<5.44 U	<4.71 U	<4.75 U	NA	<526 U	NA	<616 U	NA	<542 U	NA
ACETONE	ug/kg	<10.9 U	<9.42 U	<9.5 U	NA	<1050 U	NA	<1230 U	NA	<1080 U	NA
BENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
BROMOBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
BROMOCHLOROMETHANE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
BROMODICHLOROMETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
BROMOFORM	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
BROMOMETHANE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
CARBON DISULFIDE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
CARBON TETRACHLORIDE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
CHLOROBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
CHLOROETHANE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
CHLOROFORM	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
CHLOROMETHANE	ug/kg	<4.35 U	<3.77 U	<3.8 U	NA	<420 U	NA	<493 U	NA	<434 U	NA
CIS-1,2-DICHLOROETHENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	2040	NA	5650	NA	103 J	NA
CIS-1,3-DICHLOROPROPENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
DIBROMOCHLOROMETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
DIBROMOMETHANE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
DICHLORODIFLUOROMETHANE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
ETHYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
HEXACHLOROBUTADIENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
ISOPROPYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
m,p-Xylene	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
METHYLENE CHLORIDE	ug/kg	1.27 J	0.966 J	1.53 J	NA	165 J	NA	<246 U	NA	<217 U	NA
NAPHTHALENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
N-BUTYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
N-PROPYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
O-XYLENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
P-ISOPROPYLTOLUENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
SEC-BUTYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
STYRENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
TERT-BUTYLBENZENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
TETRACHLOROETHENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
TOLUENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
TRANS-1,2-DICHLOROETHENE	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
TRANS-1,3-DICHLOROPROPEN	ug/kg	<1.09 U	<0.942 U	<0.95 U	NA	<105 U	NA	<123 U	NA	<108 U	NA
TRICHLOROETHENE	ug/kg	4.83 J	13.8	8.42	NA	6230	NA	14400	NA	1550	NA
TRICHLOROFLUOROMETHANE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
VINYL CHLORIDE	ug/kg	<2.18 U	<1.88 U	<1.9 U	NA	<210 U	NA	<246 U	NA	<217 U	NA
Sulfide (9034)											
SULFIDE	mg/kg	<59.1 U	<60.9 U	<59.7 U	NA	<59.8 U	NA	<64.8 U	NA	<61.5 U	NA
pH (9045D)											
PH	PH	6.53	7.19	6.49	NA	6.92	NA	8.27	NA	5.91	NA

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT21 (16-17) 280313 3/28/2013	18CPT21 (27-28) 280313 3/28/2013	18CPT21 (27-28) 280313 3/28/2013	18CPT21 (48-49) 280313 3/28/2013	18CPT21 (48-49) 280313 3/28/2013	18CPT21 (48-49) 280313D 3/28/2013	18CPT21 (48-49) 280313D 3/28/2013	18CPT24 (31-32) 260313 3/26/2013	18CPT25 (15-16) 250313 3/25/2013	18CPT25 (15-16) 250313 3/25/2013
ID Location:		Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – NNE, inside the fence line, middle region	Site 18/24 – E, outside the fence line, just along the perimeter road	Site 18/24 – N, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region
Metals (6010C and 6020A)											
IRON	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	9510
SELENIUM	mg/kg	<0.926 U	NA	<0.88 U	NA	0.576 J	NA	0.578 J	NA	NA	<4.59 U
ARSENIC	mg/kg	1.39	NA	1.85	NA	0.567 J	NA	0.563 J	NA	NA	0.971
BARIUM	mg/kg	34.8	NA	123	NA	132	NA	120	NA	NA	111
CADMIUM	mg/kg	<0.121 U	NA	0.0764 J	NA	<0.127 U	NA	<0.122 U	NA	NA	<0.116 U
CHROMIUM	mg/kg	5.61	NA	7.39	NA	9.85	NA	6.43	NA	NA	7.06
LEAD	mg/kg	7.17	NA	5.77	NA	13.2	NA	9.83	NA	NA	8.2
SILVER	mg/kg	<0.244 U	NA	<0.242 U	NA	<0.25 U	NA	<0.241 U	NA	NA	<0.239 U
Perchlorate (6850)											
PERCHLORATE	ug/kg	NA	18	NA	2100	NA	26000	NA	30	4.9	NA
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/kg	<2.46 U	NA	<2.45 U	NA	<2.51 U	NA	1.83 J	NA	NA	<4.9 U
Mercury (7471A)											
MERCURY	mg/kg	0.0137 J	NA	<0.024 U	NA	<0.0242 U	NA	<0.0254 U	NA	NA	<0.024 U
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,1,1-TRICHLOROETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	86500 J	NA	NA	<119 U
1,1,2,2-TETRACHLOROETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,1,2-TRICHLOROETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,1-DICHLOROETHANE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
1,1-DICHLOROETHENE	ug/kg	165 J	NA	644 J	NA	<56800 U	NA	<83500 U	NA	NA	117 J
1,1-DICHLOROPROPENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,2,3-TRICHLOROBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,2,3-TRICHLOROPROPANE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
1,2,4-TRICHLOROBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,2,4-TRIMETHYLBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,2-DIBROMO-3-CHLOROPROP/	ug/kg	<675 U	NA	<3350 U	NA	<227000 U	NA	<334000 U	NA	NA	<476 U
1,2-DIBROMOETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,2-DICHLOROBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,2-DICHLOROETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,2-DICHLOROPROPANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,3,5-TRIMETHYLBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,3-DICHLOROBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,3-DICHLOROPROPANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
1,4-DICHLOROBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
2,2-DICHLOROPROPANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
2-BUTANONE	ug/kg	<844 U	NA	<4190 U	NA	<284000 U	NA	<417000 U	NA	NA	<595 U
2-CHLOROTOLUENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
2-HEXANONE	ug/kg	<844 U	NA	<4190 U	NA	<284000 U	NA	<417000 U	NA	NA	<595 U
4-CHLOROTOLUENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
4-METHYL-2-PENTANONE	ug/kg	<844 U	NA	<4190 U	NA	<284000 U	NA	<417000 U	NA	NA	<595 U
ACETONE	ug/kg	<1690 U	NA	<8390 U	NA	<568000 U	NA	<835000 U	NA	NA	<1190 U
BENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
BROMOBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
BROMOCHLOROMETHANE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
BROMODICHLOROMETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
BROMOFORM	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
BROMOMETHANE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
CARBON DISULFIDE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
CARBON TETRACHLORIDE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
CHLOROBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
CHLOROETHANE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
CHLOROFORM	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
CHLOROMETHANE	ug/kg	<675 U	NA	<3350 U	NA	<227000 U	NA	<334000 U	NA	NA	<476 U
CIS-1,2-DICHLOROETHENE	ug/kg	3330	NA	1410 J	NA	<56800 U	NA	<83500 U	NA	NA	276 J
CIS-1,3-DICHLOROPROPENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
DIBROMOCHLOROMETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
DIBROMOMETHANE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
DICHLORODIFLUOROMETHANE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
ETHYLBENZENE	ug/kg	85.3 J	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
HEXACHLOROBUTADIENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
ISOPROPYLBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
m,p-Xylene	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
METHYLENE CHLORIDE	ug/kg	533 J	NA	108000	NA	2910000	NA	6410000	NA	NA	<238 U
NAPHTHALENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
N-BUTYLBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
N-PROPYLBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
O-XYLENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
P-ISOPROPYLTOLUENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
SEC-BUTYLBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
STYRENE	ug/kg	<169 U	NA	<839 U	NA	56800 J	NA	139000 J	NA	NA	<119 U
TERT-BUTYLBENZENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
TETRACHLOROETHENE	ug/kg	1910	NA	3420 J	NA	41100 J	NA	71300 J	NA	NA	<119 U
TOLUENE	ug/kg	92.7 J	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
TRANS-1,2-DICHLOROETHENE	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
TRANS-1,3-DICHLOROPROPEN	ug/kg	<169 U	NA	<839 U	NA	<56800 U	NA	<83500 U	NA	NA	<119 U
TRICHLOROETHENE	ug/kg	11600	NA	70400	NA	3870000	NA	15300000	NA	NA	7960
TRICHLOROFLUOROMETHANE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
VINYL CHLORIDE	ug/kg	<338 U	NA	<1680 U	NA	<114000 U	NA	<167000 U	NA	NA	<238 U
Sulfide (9034)											
SULFIDE	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	<61.3 U
pH (9045D)											
PH	PH	9.1	NA	6.35	NA	6.83	NA	6.83	NA	NA	5.8

J - Estimated: The analyte was positively identified, the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.

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.

Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT25 (21-22) 250313 3/25/2013	18CPT25 (21-22) 250313 3/25/2013	18CPT25 (31-32) 260313 3/26/2013	18CPT26 (9-10) 250313 3/25/2013	18CPT26 (9-10) 250313 3/25/2013	18CPT26 (22-23) 250313 3/25/2013	18CPT26 (22-23) 250313 3/25/2013	18CPT27 (7-8) 280313 3/27/2013	18CPT27 (7-8) 280313 3/28/2013	18CPT27 (17-18) 280313 3/28/2013
ID Location:		Site 18/24 – N, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region	Site 18/24 – N, inside the fence line, middle region	Site 18/24 – WSW, inside the fence line, outter region	Site 18/24 – WSW, inside the fence line, outter region	Site 18/24 – WSW, inside the fence line, outter region
Metals (6010C and 6020A)											
IRON	mg/kg	NA	12200	NA	NA	9380	NA	7350	2490	NA	NA
SELENIUM	mg/kg	NA	<4.55 U	<0.829 U	NA	<4.15 U	NA	<3.96 U	NA	NA	NA
ARSENIC	mg/kg	NA	2.55	0.765	NA	1.75	NA	0.89	NA	NA	NA
BARIUM	mg/kg	NA	137	86.6	NA	80.3	NA	9.76	NA	NA	NA
CADMIUM	mg/kg	NA	<0.118 U	<0.119 U	NA	<0.12 U	NA	<0.112 U	NA	NA	NA
CHROMIUM	mg/kg	NA	7.39	2.05	NA	5.92	NA	4.3	NA	NA	NA
LEAD	mg/kg	NA	6.32	3.15	NA	5.71	NA	4.25	NA	NA	NA
SILVER	mg/kg	NA	<0.243 U	<0.222 U	NA	<0.242 U	NA	<0.231 U	NA	NA	NA
Perchlorate (6850)											
PERCHLORATE	ug/kg	7	NA	NA	2.7	NA	100000	NA	NA	5.7	880
Hexavalent Chromium (7196A)											
HEXAVALENT CHROMIUM	mg/kg	NA	<4.77 U	<2.37 U	NA	<11.9 U	NA	<4.61 U	NA	NA	NA
Mercury (7471A)											
MERCURY	mg/kg	NA	<0.0244 U	<0.0229 U	NA	0.0134 J	NA	<0.0226 U	NA	NA	NA
Volatile Organic Compounds (8260B)											
1,1,1,2-TETRACHLOROETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,1,1-TRICHLOROETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	344 J	NA	NA
1,1,2,2-TETRACHLOROETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,1,2-TRICHLOROETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,1-DICHLOROETHANE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	<244 U	NA	NA
1,1-DICHLOROETHENE	ug/kg	NA	114 J	262 J	NA	<0.927 U	NA	<1.02 U	609 J	NA	NA
1,1-DICHLOROPROPENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,2,3-TRICHLOROBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,2,3-TRICHLOROPROPANE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	<244 U	NA	NA
1,2,4-TRICHLOROBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,2,4-TRIMETHYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,2-DIBROMO-3-CHLOROPROP/	ug/kg	NA	<428 U	<567 U	NA	<3.71 U	NA	<4.07 U	<488 U	NA	NA
1,2-DIBROMOETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,2-DICHLOROBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,2-DICHLOROETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,2-DICHLOROPROPANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,3,5-TRIMETHYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,3-DICHLOROBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,3-DICHLOROPROPANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
1,4-DICHLOROBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
2,2-DICHLOROPROPANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
2-BUTANONE	ug/kg	NA	<535 U	<709 U	NA	3.43 J	NA	<5.08 U	<610 U	NA	NA
2-CHLOROTOLUENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
2-HEXANONE	ug/kg	NA	<535 U	<709 U	NA	<4.63 U	NA	<5.08 U	<610 U	NA	NA
4-CHLOROTOLUENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
4-METHYL-2-PENTANONE	ug/kg	NA	<535 U	<709 U	NA	<4.63 U	NA	<5.08 U	<610 U	NA	NA
ACETONE	ug/kg	NA	<1070 U	<1420 U	NA	35.1	NA	<10.2 U	<1220 U	NA	NA
BENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
BROMOBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
BROMOCHLOROMETHANE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	<244 U	NA	NA
BROMODICHLOROMETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
BROMOFORM	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
BROMOMETHANE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	<244 U	NA	NA
CARBON DISULFIDE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
CARBON TETRACHLORIDE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
CHLOROBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
CHLOROETHANE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	<244 U	NA	NA
CHLOROFORM	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
CHLOROMETHANE	ug/kg	NA	<428 U	<567 U	NA	<3.71 U	NA	<4.07 U	<488 U	NA	NA
CIS-1,2-DICHLOROETHENE	ug/kg	NA	273 J	211 J	NA	<0.927 U	NA	2.44 J	22800	NA	NA
CIS-1,3-DICHLOROPROPENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
DIBROMOCHLOROMETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
DIBROMOMETHANE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
DICHLORODIFLUOROMETHANE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	<244 U	NA	NA
ETHYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	247 J	NA	NA
HEXACHLOROBUTADIENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
ISOPROPYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
m,p-Xylene	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
METHYLENE CHLORIDE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	3030	NA	NA
NAPHTHALENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
N-BUTYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
N-PROPYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
O-XYLENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
P-ISOPROPYLTOLUENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
SEC-BUTYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
STYRENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	1140	NA	NA
TERT-BUTYLBENZENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
TETRACHLOROETHENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
TOLUENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	171 J	NA	NA
TRANS-1,2-DICHLOROETHENE	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
TRANS-1,3-DICHLOROPROPEN	ug/kg	NA	<107 U	<142 U	NA	<0.927 U	NA	<1.02 U	<122 U	NA	NA
TRICHLOROETHENE	ug/kg	NA	7670	13000	NA	<0.927 U	NA	0.977 J	28200	NA	NA
TRICHLOROFLUOROMETHANE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	<244 U	NA	NA
VINYL CHLORIDE	ug/kg	NA	<214 U	<284 U	NA	<1.85 U	NA	<2.03 U	645	NA	NA
Sulfide (9034)											
SULFIDE	mg/kg	NA	<61.1 U	NA	NA	<60.7 U	NA	<58.7 U	<60.6 U	NA	NA
pH (9045D)											
PH	PH	NA	6.18	6.65	NA	7	NA	6.68	7.22	NA	NA

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Yellow highlighting indicates analyte detected above Reporting Limit

Location ID: Date Sampled:	Unit	18CPT27 (17-18) 280313 3/28/2013	18CPT27 (26-27) 280313 3/28/2013	18CPT27 (26-27) 280313 3/28/2013	18CPT27 (33-34) 280313 3/28/2013	18CPT27 (33-34) 280313 3/28/2013
ID Location:		Site 18/24 – WSW, inside the fence line, outter region	Site 18/24 – WSW, inside the fence line, outter region	Site 18/24 – WSW, inside the fence line, outter region	Site 18/24 – WSW, inside the fence line, outter region	Site 18/24 – WSW, inside the fence line, outter region
Metals (6010C and 6020A)						
IRON	mg/kg	2300	NA	9080	NA	7080
SELENIUM	mg/kg	NA	NA	NA	NA	NA
ARSENIC	mg/kg	NA	NA	NA	NA	NA
BARIUM	mg/kg	NA	NA	NA	NA	NA
CADMIUM	mg/kg	NA	NA	NA	NA	NA
CHROMIUM	mg/kg	NA	NA	NA	NA	NA
LEAD	mg/kg	NA	NA	NA	NA	NA
SILVER	mg/kg	NA	NA	NA	NA	NA
Perchlorate (6850)						
PERCHLORATE	ug/kg	NA	170000	NA	35000	NA
Hexavalent Chromium (7196A)						
HEXAVALENT CHROMIUM	mg/kg	NA	NA	NA	NA	NA
Mercury (7471A)						
MERCURY	mg/kg	NA	NA	NA	NA	NA
Volatile Organic Compounds (8260B)						
1,1,1,2-TETRACHLOROETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,1,1-TRICHLOROETHANE	ug/kg	13300	NA	23200	NA	2280 J
1,1,2,2-TETRACHLOROETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,1,2-TRICHLOROETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,1-DICHLOROETHANE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
1,1-DICHLOROETHENE	ug/kg	3120 J	NA	5260 J	NA	5230 J
1,1-DICHLOROPROPENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,2,3-TRICHLOROBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,2,3-TRICHLOROPROPANE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
1,2,4-TRICHLOROBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,2,4-TRIMETHYLBENZENE	ug/kg	<1160 U	NA	1420 J	NA	<1200 U
1,2-DIBROMO-3-CHLOROPROPA	ug/kg	<4650 U	NA	<4290 U	NA	<4780 U
1,2-DIBROMOETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,2-DICHLOROBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,2-DICHLOROETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,2-DICHLOROPROPANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,3,5-TRIMETHYLBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,3-DICHLOROBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,3-DICHLOROPROPANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
1,4-DICHLOROBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
2,2-DICHLOROPROPANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
2-BUTANONE	ug/kg	<5810 U	NA	<5370 U	NA	<5980 U
2-CHLOROTOLUENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
2-HEXANONE	ug/kg	<5810 U	NA	<5370 U	NA	<5980 U
4-CHLOROTOLUENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
4-METHYL-2-PENTANONE	ug/kg	<5810 U	NA	<5370 U	NA	<5980 U
ACETONE	ug/kg	<11600 U	NA	<10700 U	NA	<12000 U
BENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
BROMOBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
BROMOCHLOROMETHANE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
BROMODICHLOROMETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
BROMOFORM	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
BROMOMETHANE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
CARBON DISULFIDE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
CARBON TETRACHLORIDE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
CHLOROBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
CHLOROETHANE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
CHLOROFORM	ug/kg	<1160 U	NA	1080 J	NA	<1200 U
CHLOROMETHANE	ug/kg	<4650 U	NA	<4290 U	NA	<4780 U
CIS-1,2-DICHLOROETHENE	ug/kg	2190 J	NA	<1070 U	NA	<1200 U
CIS-1,3-DICHLOROPROPENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
DIBROMOCHLOROMETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
DIBROMOMETHANE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
DICHLORODIFLUOROMETHANE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
ETHYLBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
HEXACHLOROBUTADIENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
ISOPROPYLBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
m,p-Xylene	ug/kg	<1160 U	NA	1290 J	NA	<1200 U
METHYLENE CHLORIDE	ug/kg	47600	NA	4950000	NA	2670000
NAPHTHALENE	ug/kg	<1160 U	NA	1010 J	NA	<1200 U
N-BUTYLBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
N-PROPYLBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
O-XYLENE	ug/kg	<1160 U	NA	787 J	NA	<1200 U
P-ISOPROPYLTOLUENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
SEC-BUTYLBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
STYRENE	ug/kg	7050	NA	27500	NA	2870 J
TERT-BUTYLBENZENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
TETRACHLOROETHENE	ug/kg	767 J	NA	1200 J	NA	<1200 U
TOLUENE	ug/kg	<1160 U	NA	1550 J	NA	<1200 U
TRANS-1,2-DICHLOROETHENE	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
TRANS-1,3-DICHLOROPROPEN	ug/kg	<1160 U	NA	<1070 U	NA	<1200 U
TRICHLOROETHENE	ug/kg	402000	NA	2830000	NA	460000
TRICHLOROFLUOROMETHANE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
VINYL CHLORIDE	ug/kg	<2320 U	NA	<2150 U	NA	<2390 U
Sulfide (9034)						
SULFIDE	mg/kg	<62.4 U	NA	<61.1 U	NA	<63.2 U
pH (9045D)						
PH	PH	5.62	NA	5.6	NA	5.81

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Analysis of Harrison Bayou Water Quality for Surface Discharge Considerations

Historically, the State of Texas has not had numerical criteria for nutrients in their surface water quality standards. In Texas, nutrient controls have taken the form of narrative criteria, watershed rules, and antidegradation considerations in permitting actions. The Texas Commission on Environmental Quality (TCEQ) is now conducting additional studies and evaluations to develop potential numerical nutrient criteria for selected streams, rivers, and estuaries in Texas. Numerical criteria for these other types of water bodies will also be developed and considered with extensive public participation.

The information presented below was obtained from most recent TCEQ regulations and guidance to assess water quality conditions of Harrison Bayou (HB) and determine whether numerical limits on nutrient loads should be considered. To accomplish this task, HB watershed was evaluated and the information is presented below. **Figure 1** (Data Server for Caddo Lake - online) provides a map of Caddo Lake watershed associated with HB. **Figure 2** provides a summary of the information presented in this document.

Designated Segments (30TAC§307.10(3))

HB is not a designated segment by the TCEQ. However, there are 10 designated segments in the watershed area associated with HB such as Caddo Lake, Lake O' the Pines, and Lake Cypress Springs.

Site-specific Uses and Criteria for Classified Segments (30 TAC §307.10(1))

Site-specific uses for classified segments including recreational, aquatic life, and domestic water supply. The majority of classified segments are identified to be suitable for recreational, aquatic life, and domestic water supply uses. The criteria for classified segments include pH, temperature, and chloride, sulfate, total dissolved solids (TDS), dissolved oxygen (DO), and indicator bacteria concentrations.

Site-specific Uses and Criteria for Unclassified Water Bodies (§307.10(4))

HB is not a classified segment and is listed under unclassified segments in §307.10(4). The water bodies are included in §307.10(4) because a regulatory action has been taken or is anticipated to be taken by the TCEQ or because sufficient information exists to provide an aquatic life use designation. In the table below, the segment numbers listed refer to the designated segments as defined in §307.10(3). The water body is a tributary within the drainage basin of the listed segment. The description defines the specific area where the aquatic life use designation pertains. Generally, there is not sufficient data on these waters to develop other conventional criteria and those criteria are considered the same as for the segment where the water body is located unless further site-specific information is obtained.

Segment	County	Water Body	ALU	DO	Segment Description
0401 (Caddo Lake)	Harrison	Harrison Bayou (0401-02)	High	≤ 5.0	*Intermittent stream with perennial pools from the confluence with Caddo Lake within the Caddo Lake National Wildlife Refuge* (also known as the Longhorn Ordinance Works facility) *east of the City of Karnack upstream to FM 1998 east of the City of Marshall*

ALU – aquatic life use [The establishment of numerical criteria for aquatic life is highly dependent on desired use, sensitivities of aquatic communities, and local physical and chemical characteristics. Six subcategories of aquatic life use are established. They include minimal, limited, intermediate, high, and exceptional aquatic life and oyster waters.]
DO – dissolved oxygen [The characteristics and associated dissolved oxygen criteria for limited, intermediate, high, and exceptional aquatic life use subcategories are indicated in §307.7(b)(3)(A)(i) [Table 3].]

Sole-source Surface Drinking Water Supplies (§307.3)

The Caddo Lake watershed was assessed for sole-source drinking water supplies. Sole-source protection zones of sole-source surface drinking water supplies are defined in §307.3 (relating to Definitions and Abbreviations). The table below identifies sole-source surface water supplies in this watershed and all of these water supplies are not influenced or associated with HB.

Water Body Name	County	Segment No.
Big Cypress Creek below Lake O' the Pines	Harrison	0402
Lake O' the Pines	Marion	0403
Lake Cypress Springs	Franklin	0405
Lake Bob Sandlin	Camp, Titus	0408

Analysis of Nutrient Criteria (RG-194 draft 2011)

The following information pertains specifically to analysis of whether HB has numerical nutrient criteria.

The TCEQ has included numerical criteria for nutrients in major reservoirs in the Standards. The criteria are based on historical chlorophyll a data from the main body of selected reservoirs. The TCEQ plans to develop nutrient criteria for streams and rivers, estuaries, and wetlands and evaluate them for inclusion in a future Standards revision. However, these standards currently do not exist.

Only Lake Cypress Springs (Segment 0405) in the watershed associated with HB has a chlorophyll a nutrient criteria of 17.54 ug/L (§307.10(6) Appendix F). Note that no other segment within Caddo Lake watershed has numerical nutrient criteria.

The nutrient screening procedures constitute the basis for the antidegradation review(s) for nutrients ("Antidegradation" on page 55 of RG-194). For streams or rivers, the screening is performed regardless of the permitted flow size to evaluate local effects under the narrative provisions of the Standards. Hence, local effects need to be evaluated for discharges to HB.

Nutrient Screening for Streams and Rivers (Page 47 of RG-194 Draft 2011)

To assess local effects in streams and rivers from discharges under the narrative nutrient provisions of the Standards, the TCEQ first evaluates the discharge using the general guidelines. For HB, general guidelines are not applicable because no change in HB characteristics downstream of discharge point is observed.

If the general guidelines in this section indicate that a total phosphorous (TP) limit should be considered, then the TCEQ conducts a more comprehensive review using site-specific screening factors. Eutrophication potential is rated as a low, moderate, or high level of concern for each factor. Some screening factors can be rated on either qualitative or quantitative information, depending on data availability. Not every factor is always appropriate or definable at a particular site.

These screening procedures are primarily intended for freshwater streams and rivers. If a stream or river changes characteristics downstream of the discharge such that eutrophication impacts might be greater in downstream areas, then screening procedures are also applicable to those downstream reaches. As a rough guide, nutrient screening procedures are typically applied for the following permitted discharge sizes within the following distance of the discharge point:

Permitted Flow (mgd)	Evaluation Distance (downstream miles)
< 0.25	< 3
0.25 to < 1.0	< 7
≥ 1.0*	< 15

*Very large discharges may be evaluated on a case-by-case basis.

General Guidelines for Assigning TP Limits

TP limits are potentially indicated in the following situations:

- for new or expanding discharges with permitted flow ≥ 0.25 MGD to perennial, shallow, relatively clear streams with rocky bottoms or other substrates that promote the growth of attached vegetation;
- for new or expanding discharges with permitted flow ≥ 0.25 MGD to streams with long, shallow, relatively clear perennial impoundments; and
- where explicitly required by watershed rules or other specific regulatory requirements.

None of the above criteria apply to the Groundwater Treatment Plant (GWTP) at the former Longhorn Army Ammunition Plant (LHAAP) because the GWTP discharge flow rate is < 0.1 mgd; hence, the TP limits are not applicable to HB.

Site-Specific Screening Factors

Assessment of site-specific screening factors was conducted in the following sections to further evaluate the potential need for a TP limit to control instream vegetation growth in HB. These screening factors include the following:

A. size of discharge
B. instream dilution
C. sensitivity to growth of attached algae—type of bottom
D. sensitivity to growth of attached vegetation—depth
E. sensitivity to nutrient enrichment—water clarity
F. sensitivity to growth of aquatic vegetation—observations
G. sensitivity to growth of aquatic vegetation—shading and sunlight
H. streamflow sustainability
I. impoundments and pools
J. consistency with other permits
K. existence of listed concern for nutrients or aquatic vegetation in the TCEQ's integrated report (30 TAC § 305(b))

The level of concern (low, moderate, or high) for each of these factors is described in the table below. Calculations are based on 7Q2 stream flows unless otherwise indicated.

Site-Specific Factor	Level of Concern	Criteria	Selected Level of Concern
Size of discharge	Low	< 0.25	Low; GWTP discharge rate < 0.25 mgd
	Moderate	0.25 to 1.0	
	High	≥ 1.0	
Instream Dilution	Low	< 10	Low to Moderate; ratio of GWTP discharge rate to HB flow rate ≤ 15
	Moderate	10 to < 25	
	High	≥ 25	
Sensitivity to Growth of Attached Algae – Type of Bottom	Low	Mud or sand	Low; the bottom is mud with little to no rocks.
	Moderate	Rocky Cobble, gravel, usually with riffle areas	
	High	Larger rocks and boulders, rock slabs	
Sensitivity to Growth of Attached Vegetation	Low	Relatively steep banks and deep channels across stream	Moderate; HB banks are gently sloping with some shallow areas
	Moderate	Gently sloping sides with some shallow areas	
	High	Substantial shallow areas near banks and in stream channels	
Sensitivity to Nutrient Enrichment – Water Clarity	Low	Turbid from suspended particles or color (tannins), bottom may not be visible	Low; the creek bottom is not visible due to turbidity
	Moderate	Some visible turbidity but without heavy murkiness, bottom sometimes visible	
	High	Relatively clear water, bottom usually visible	

Site-Specific Factor	Level of Concern	Criteria	Selected Level of Concern
Sensitivity to Growth of Aquatic Vegetation – Observations	Low	Little attached, floating, or suspended aquatic vegetation	Moderate; limited patches attached, floating, or suspended aquatic vegetation are typically observed
	Moderate	Limited patches attached, floating, or suspended aquatic vegetation	
	High	Heavy patches of vegetation in areas with nutrient input	
Sensitivity to Growth of Aquatic Vegetation – Shading and Sunlight	Low	Extensive canopy cover shades most of stream surface	Low; canopy cover is extensive and shades most of stream
	Moderate	Substantial canopy cover, but shading is only partial and not equivalent to "deep woods"	
	High	Canopy cover diffuses light to some extent, but substantial light reaches stream surface	
Streamflow Sustainability	Low	Intermittent	Moderate; the stream is classified as intermittent with perennial pools
	Moderate	Intermittent with perennial pools	
	High	Perennial	
Impoundment and Pools	Low	No impoundments > 300 feet in length and no reach with extensive smaller pools	Low; HB has no impoundments > 300 feet in length or reaches with extensive smaller pools
	Moderate	No impoundments > 300 feet in length, but substantial smaller pools > 20% of affected reach	
	High	At least one impoundment > 300 feet in length	
Consistency with other Permits	Low	Similar permits usually do not have effluent limits for TP	Unknown but likely low; the GWTP is unique as it treats contaminated groundwater and not domestic or industrial wastewater; additionally, the flowrates are intermittent (no more than twice per week and do not occur in the summer with HB low flow conditions per iROD requirements) and much smaller than would be anticipated for a municipal or industrial dischargers
	Moderate	There are some similar permits with TP limits, but applicability is site-specific and not "across the board"	
	High	Discharges with similar characteristics usually have a TP limit	
Existence of Listed Concern for Nutrients of Aquatic Vegetation in the TCEQ's Integrated Report (§ 305(B))	Low	No concern for nutrients or aquatic vegetation in latest integrated report	Low; draft 2012 Texas Integrated Report [Texas 303(d) List as required under Sections 305(b) and 303(d)] identified Harrison Bayou as "depressed dissolved oxygen" since 2000 from Caddo Lake upstream 21.8 km (13.5 mi) to the confluence with NHD RC 11140306000177, an unnamed tributary approximately 2 km downstream from FM 1998; concerns for nutrients or aquatic vegetation in the latest Integrated Report were not listed
	Moderate	Concern for nutrients or aquatic vegetation in latest integrated report due to exceedance of the 85th percentile	
	High	Concern for nutrients or aquatic vegetation in latest integrated report due to documented problem with one or both of these	

iROD – interim Record of Decision

Of the 11 criteria listed above, six or seven were considered as a low level of concern and three or four as a moderate level of concern with one factor unknown. Therefore, based on this assessment, the TP concern should be considered low for HB and no numerical TP limit for GWTP discharge would be necessary.

Conclusion

An assessment of the applicability of the Texas surface water quality standards (30 TAC §307) on the GWTP discharges to Harrison Bayou was conducted. This assessment was completed to determine whether specific numerical criteria for nutrients (in particular total phosphate) are applicable. Based on this assessment, it was determined that the rules are not applicable to HB.

Furthermore, site-specific screening factors were evaluated (though not technically applicable) for TP and the potential impact on HB was determined to be low.

Based on the GWTP discharge rates (< 0.025 mgd on average); the intermittent nature of the discharge (discharge occurs only when GWTP is operational); the application of controls for determining when discharge to HB could occur based on HB flowrates and treated water quality (i.e., no discharge occurs when flow in HB is below the discharge criterion specified in the iROD); and HB characteristics (type of bottom, depth characteristics, water clarity, observed aquatic vegetation, canopy cover, streamflow sustainability, presence of pools or impoundments along HB, and listing in the Integrated Report for nutrients or aquatic vegetation), there appears to be no requirements for assigning numerical criteria for nutrient limits in the GWTP effluent to HB.

References

Texas Surface Water Quality Standards. Texas Administrative Code Title 30, Part 1 Chapter 307, Texas Register 1784, April 29, 1988 as amended in Texas Register 6294 on July 22, 2010.

TCEQ Water Quality Division, RG-194, Procedures to Implement the Texas Surface Water Quality Standards, January 2012.

Draft 2012 Texas Integrated Report - Texas 303(d) List.

Current Understanding of Caddo Lake and its Watershed. Data Server for Caddo Lake Information. 2006. http://caddolakedata.us/media/290/hdr.pdf

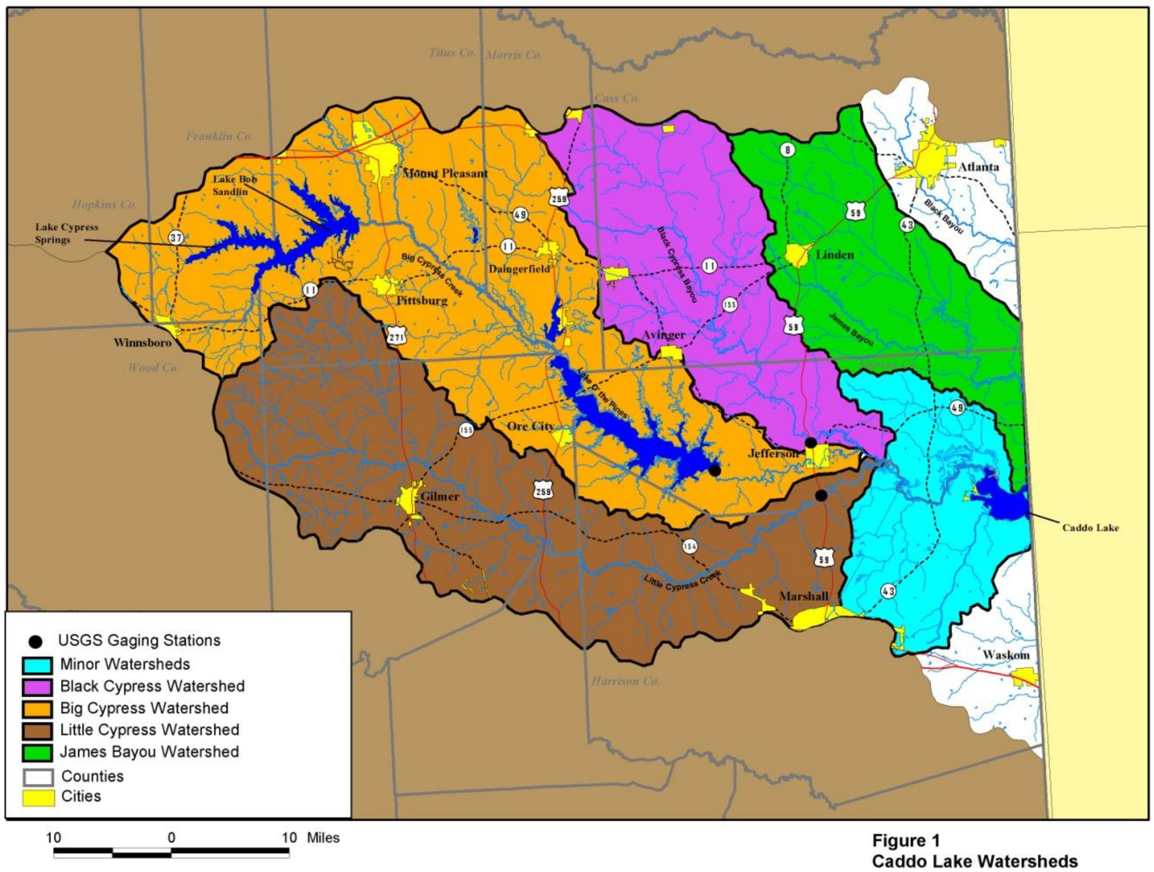

Figure 1
Caddo Lake Watersheds

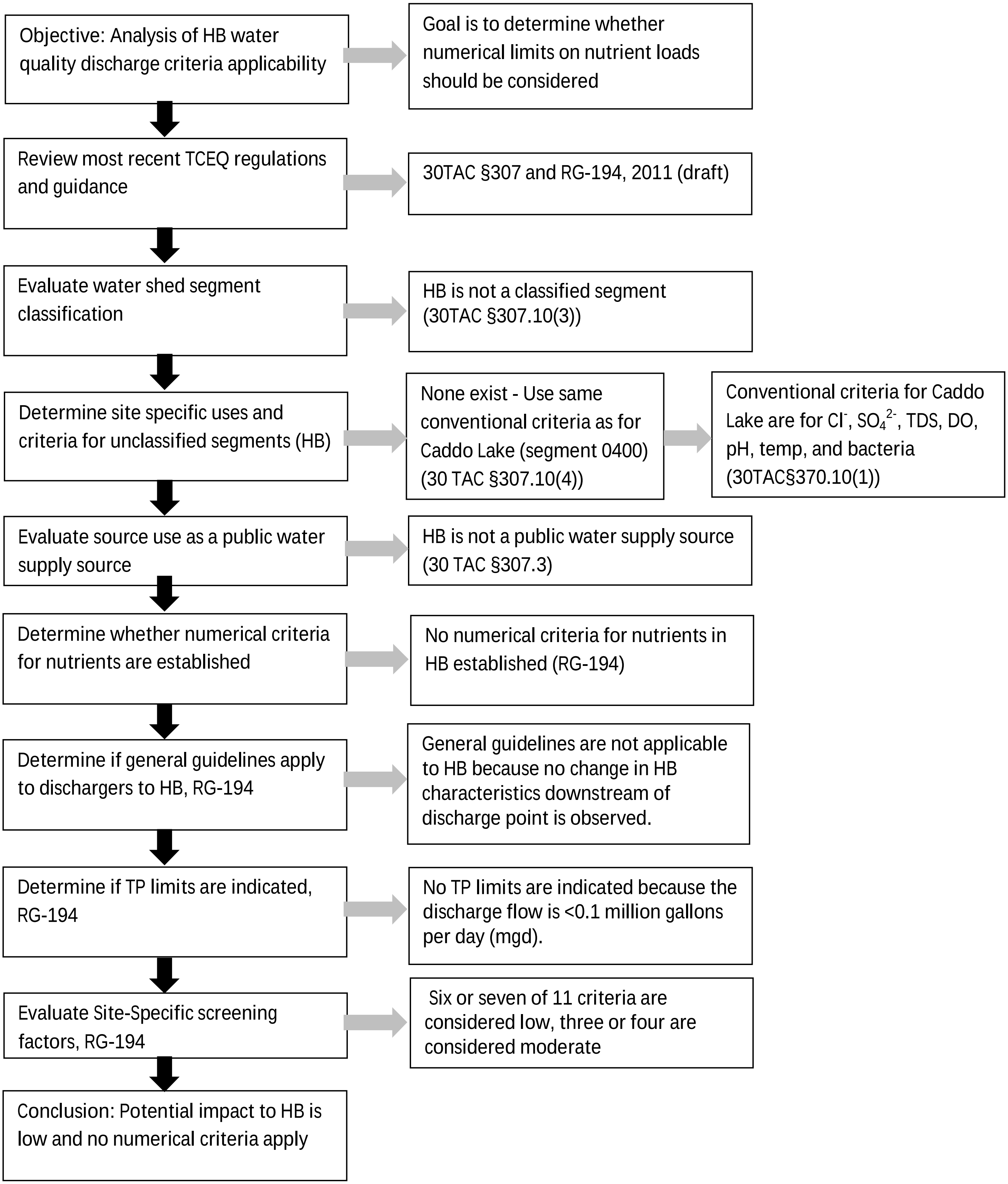

Figure 2 Assessment of Applicability of Texas Surface Water Discharge Criteria on Harrison Bayou

PUBLIC NOTICE

The United States Army invites public comment on the Proposed Plan for environmental site

LHAAP-03 (FORMER WASTE COLLECTION PAD NEAR BUILDING 722-P, PAINT SHOP)

Longhorn Army Ammunition Plant, Texas

The U.S. Army is the lead agency for environmental response actions at the former Longhorn Army Ammunition Plant (LHAAP). In partnership with the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency Region 6, the U.S. Army has developed a Proposed Plan for site LHAAP-03. Although the Proposed Plan identifies the preferred remedy for the site, the U.S. Army welcomes the public's review and comments. **The public comment period begins May 13, 2013 and ends June 12, 2013. On Thursday, May 30, 2013, from 6:00 to 7:30 p.m., the U.S. Army is inviting all interested parties to attend an open house forum to review the Proposed Plan and ask questions. The open house forum will be held at the Karnack Community Center, Highway 134 and Spur 449, Karnack, Texas.** Copies of the Proposed Plan and supporting documentation are available for public review at the Marshall Public Library, 300 S. Alamo Blvd, Marshall, Texas 75670. A summary of LHAAP-03, including a short discussion of the planned Remedial Action, is provided below.

LHAAP-03 (Former Waste Collection Pad Near Building 722-P, Paint Shop) was used for paint spray and polyurethane spray coating of materials. The soil contaminant(s) of concern (COCs) are lead and arsenic. LHAAP-03 lies within the boundary of a larger environmental site, LHAAP-35A(58), and LHAAP-03 groundwater is being addressed by activities completed for LHAAP-35A(58). The Preferred Alternative to address contaminated soil at LHAAP-03 is excavation and off-site disposal. This will result in the removal of an estimated 50-150 cubic yards of soil with disposal off-site in a permitted landfill.

For further information or to submit comments contact:

Rose Zeiler, Ph.D.

P.O. Box 220

Ratclif, Arkansas 72951

479-635-0110

rose.zeiler@us.army.mil

DEPARTMENT OF DEFENSE UNITED STATES OF AMERICA

US Army Corps of Engineers ®
Tulsa District

Longhorn Army Ammunition Plant
LHAAP-03 Proposed Plan Public Meeting

Location	LHAAP Army Trailer
Date	30-May-2013 6:00 PM **page 1 of** 1

Please sign in the space provided or add your name and address on next page if your name does not appear below.

ATTENDEES

Name (printed)	Signature	Organization	Phone	E-mail
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Robin Paul		USAEC	(210) 466-2002	robin.e.paul4.civ@mail.mil
Aaron Williams	Aaron Williams	USACE, Tulsa	(918) 669-4915	aaron.k.williams@usace.army.mil
John Lambert	John Lambert	USACE, Tulsa	(918) 669-4992	john.r.lambert@usace.army.mil
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Steve Tzhone		USEPA, Dallas	(214) 665-8409	tzhone.stephen@epa.gov
Terry Burton		USEPA, Dallas	(214) 665-7139	burton.terry@epa.gov
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Charles Dixon		"	" 938-9737	crdixon1@cobridge.TV

LHAAP-03, FORMER WASTE COLLECTION PAD BUILDING 722-P PAINT SHOP

Site History

LHAAP-03, also known as Site 03, or the Former Waste Collection Pad, is approximately 50 feet to the west of former Building 722-P, Paint Shop (see figure). LHAAP-03 was a waste collection site outside of the paint shop at Building 722-P, located at the Maintenance Shop Area within the boundary of the larger LHAAP-35A(58) site. Various investigations have been conducted at LHAAP-03 to evaluate the nature and extent of soil and groundwater impact at the Site. The groundwater at LHAAP-03 is being addressed as part of the larger LHAAP-35A(58), which includes the entire LHAAP-03 area. Site-related chemicals remaining at LHAAP-03 are the metals arsenic and lead. Multiple soil sampling events were conducted at LHAAP-03 from 2006 through 2007. The samples were analyzed in the laboratory for metals, and soil samples were found to contain lead, arsenic, VOCs, and SVOCs.

Chemicals of Concern

Investigations conducted at LHAAP-03 have identified a small area of lead and arsenic in the soil that requires action. Arsenic may be a potential source for groundwater contamination.

Remedial Alternatives for LHAAP-03

The RAOs for LHAAP-03, which address contamination associated with the media at the site and takes into account the future uses of LHAAP land and groundwater include protection of human health and the environment by minimizing the potential for leaching of COCs from impacted soil into the groundwater.

<u>Preferred Alternative 2</u>

Excavation and Off-Site Disposal

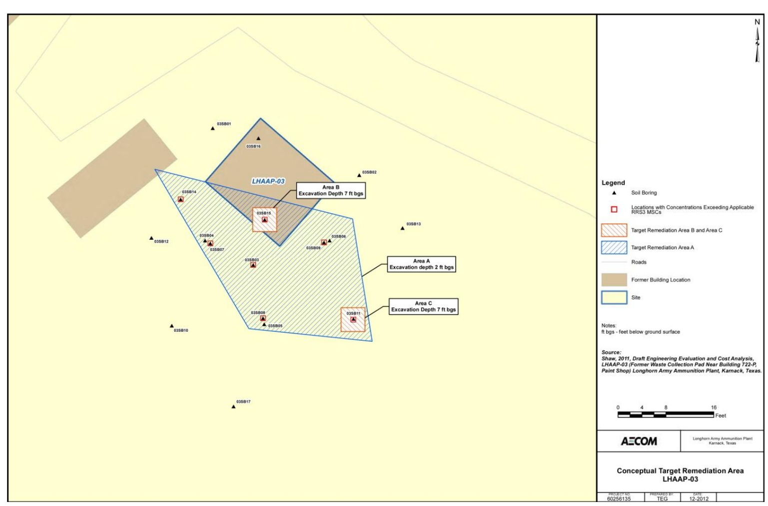
Estimated Present Worth: $87,878*

*Cost includes plans and reports, management, well abandonment, pre-excavation sampling, excavation, confirmation sampling, waste characterization and disposal, and site restoration.

As part of the Focused Feasibility Study for LHAAP-03, seven remedial technologies/process options were screened as part of this feasibility study based on:

- Their effectiveness
- Implementability
- Cost per the USEPA RI/FS guidance

These alternatives were evaluated to determine the best Remedial Action alternatives to address this small area of shallow soil contamination. The only cost effective alternative is excavation and off-site disposal. The no-action alternative was also evaluated as it is required under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The boundary planned for excavation is approximately 70 feet by 10 feet. This creates an area of approximately 700 square feet, with an estimated volume of approximately 57 bank cubic yards. Soil will be excavated down to 2 feet below ground surface except in two areas (outlined in red on the map to the right) which will be excavated past the point of contamination, estimated at 7 feet below ground surface. The estimated length of time for the excavation is 5 days.



Longhorn Army Ammunition Plant
Proposed Plan Public Meeting

Former Waste Collection Pad
Building 722-P Paint Shop
LHAAP-03

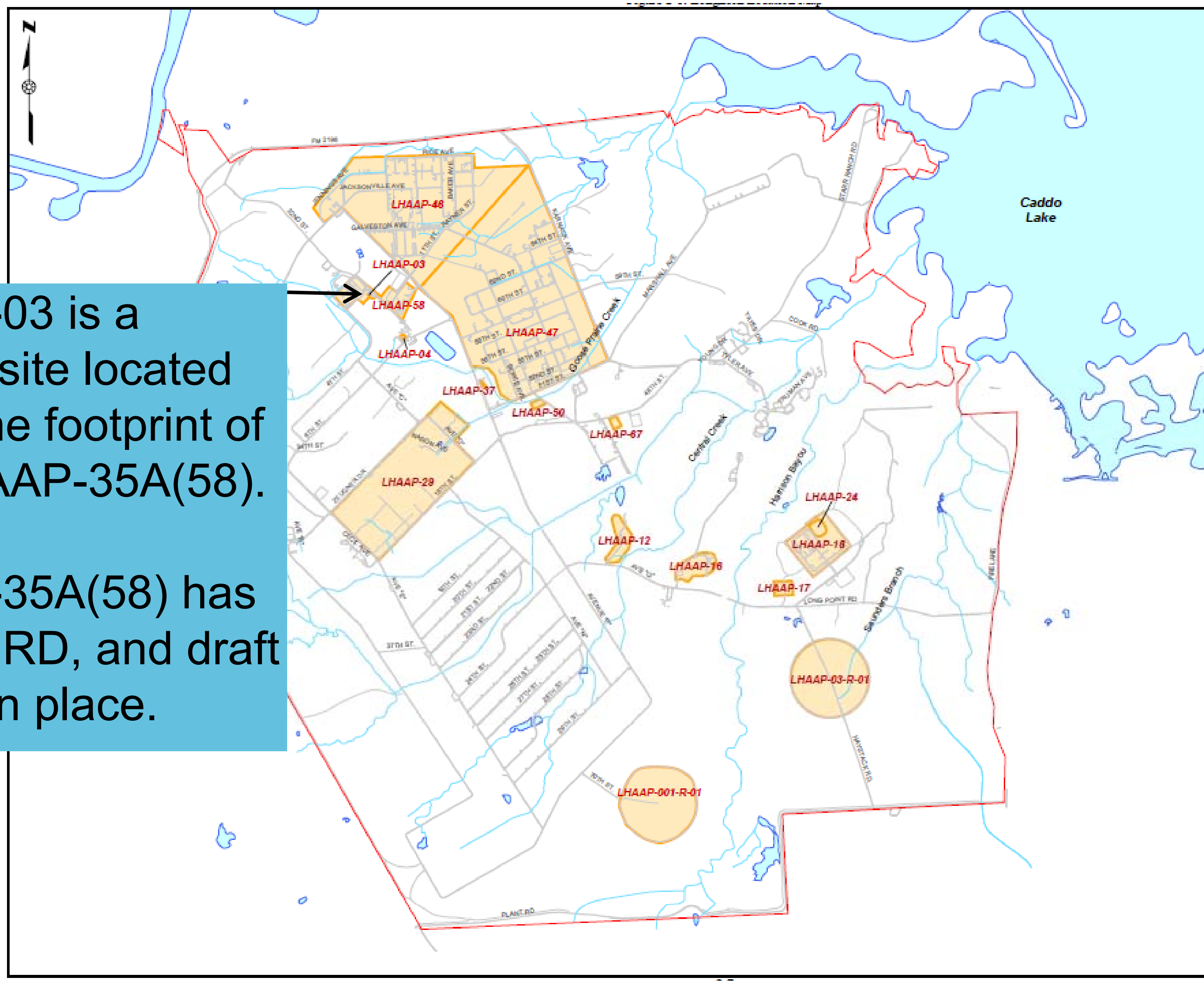
May 30, 2013

AECOM Environment

Agenda

1. Site Location
2. CERCLA Environmental Investigation and Remediation (Clean-up) Process
3. LHAAP-03 (Former Waste Collection Pad) History
4. Summary of Technologies Screened and Clean-up Alternatives Evaluated
5. Nine CERCLA Criteria were Used to Evaluate Alternatives
6. Preferred Clean-up Alternative
7. Public Involvement Process
8. Planned Schedule

Longhorn Site Locations



LHAAP-03 is a smaller site located within the footprint of site LHAAP-35A(58).

LHAAP-35A(58) has a ROD, RD, and draft RAWP in place.

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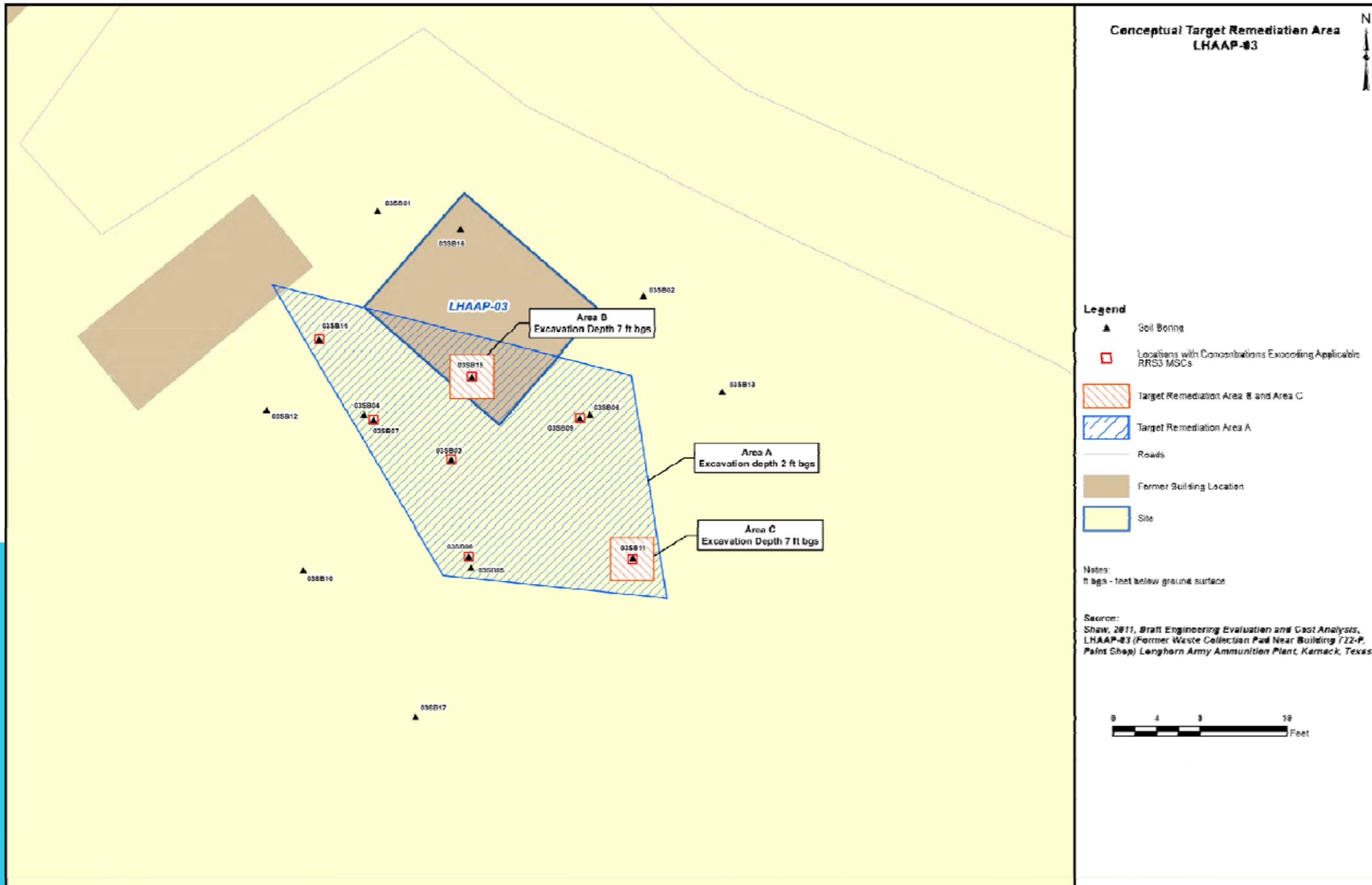
LHAAP-03 Location



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CERCLA Investigation and Remediation Process

- See Poster

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LHAAP-03 History

- LHAAP-03 is the Former Waste Collection Pad Near the Paint Shop (Building 722-P)
- The site was previously used as a waste collection site
- Site consisted of one 55-gallon drum set on a gravel pad in an open-sided shed. Waste was put into the drum until full and then hauled to Building 31-W. Waste included heavy metal based primers, waste paint, waste solvents, and contaminated rags.
- The paint shop at Building 722-P was located 50 feet west of the waste collection pad
  - Used for paint spraying and polyurethane spray coating of various items
  - Building has been demolished
- Metals in soil is the COC for the site with an estimated 50-150 cubic yards above clean-up objectives

LHAAP-03 History (cont)

- Previous Investigations consist of:
  - August 2006
    - Four soil samples collected and tested for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, and explosives
  - September 2006
    - One soil sample collected and tested for SVOCs
  - May 2007
    - One soil sample collected and subjected to the Synthetic Precipitation Leaching Procedure (SPLP) Method 1312 and analysis of total metals
  - December 2006
    - Three soil samples collected and tested for lead
  - October 2007
    - Six soil samples were collected and tested for lead and metals, subjected to SPLP Method 1312, and tested for total metals
  - December 2007
    - Six soil samples were collected and tested for metals
  - November 2008
    - Two soil samples were collected and tested for vertical delineation of arsenic, lead, and mercury

LHAAP-03 History (cont)

- Primary risk is to groundwater quality from lead and arsenic in soil with no unacceptable risk from soil identified
- The Baseline Ecological Risk Assessment concluded no unacceptable risk to ecological receptors

Remedial Action Objectives and Remediation Goals

- The Remedial Action Objective for LHAAP-03 is to protect human health and the environment by minimizing the potential for leaching of COCs from impacted soil into underlying groundwater
- The Remediation Goals for COCs in soil are protective of a potential future maintenance worker for direct exposure:
  - Arsenic at 5.9 milligrams per kilogram or less
  - Lead at 180 milligrams per kilogram or less

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Summary of Technology Processes Screened

See Poster

Seven remedial technologies/process options were screened as part of the Feasibility Study. Only two remedial alternatives were retained for detailed evaluation due to the small area of impacted soil rendering several technologies/process options ineffective, either technically or based on costs.

Summary of Clean-up Alternatives Evaluated

The following alternatives were developed and presented in the Feasibility Study document for LHAAP-03 (available for review in the Administrative Record):

- Alt 1 – No Action Alternative (required under CERCLA as a baseline)
- Alt 2 – Excavation and Off-Site Disposal

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CERCLA Nine Criteria Used to Evaluate Alternatives

The following nine criteria identified in the CERCLA process were used to evaluate the alternatives

- Overall Protection of Human Health and the Environment
- Compliance with Applicable and Relevant or Appropriate Requirements
- Long-term Effectiveness and Permanence
- Reduction in Toxicity, Mobility, or Volume through Treatment
- Short-term Effectiveness
- Implementability
- Cost
- State/Support Agency Acceptance
- Community Acceptance (community acceptance of preferred alternative will be evaluated based on comments received during public comment period).

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Preferred Clean-up Alternative

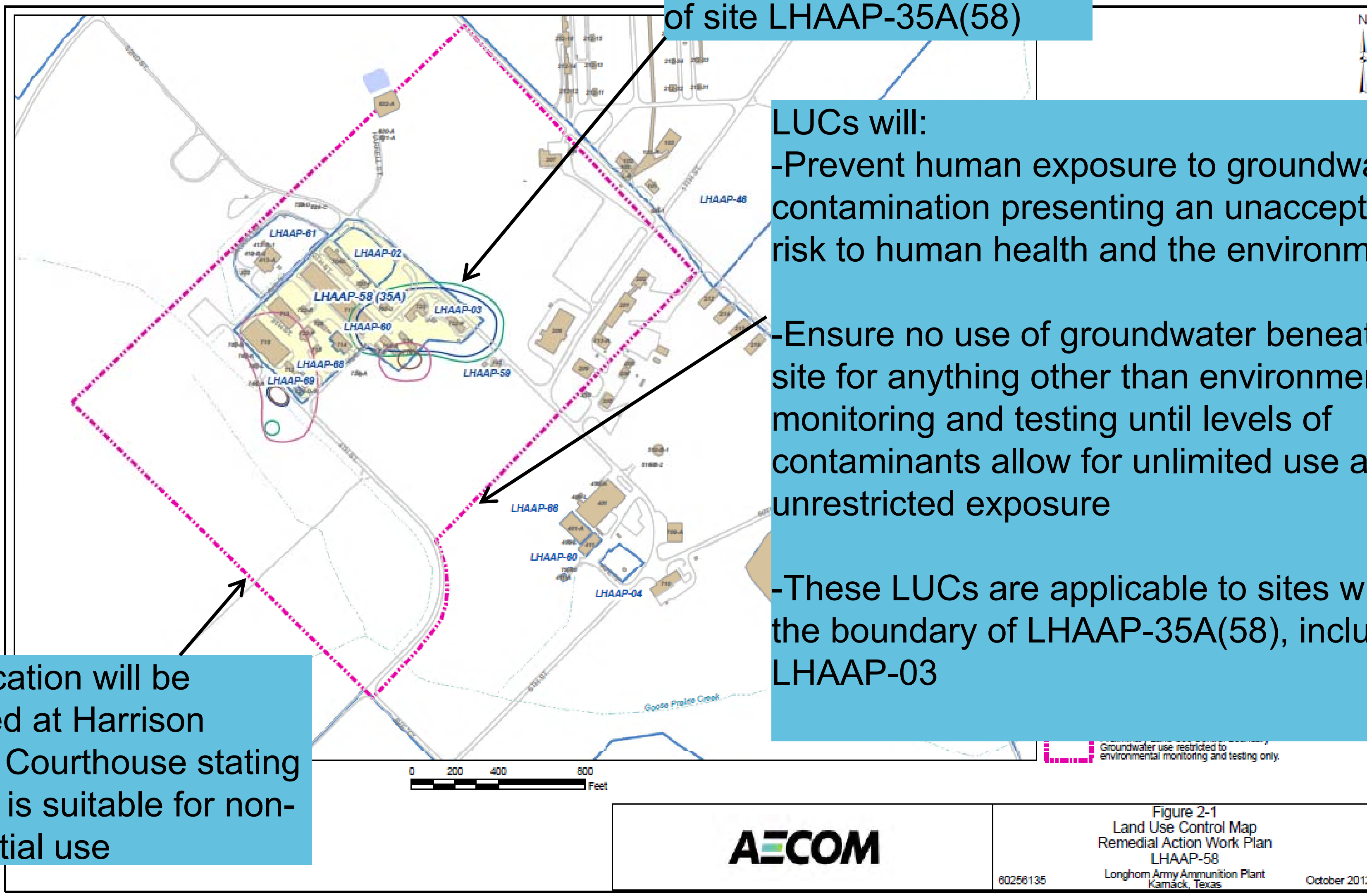
- Alternative 2 – Excavation and Off-Site Disposal
  - Alternative 2 is protective of human health and the environment
  - Complies with Applicable and Relevant and Appropriate Requirements
  - Is expected to achieve Remedial Action Objectives
  - Is efficient, quick, and effective at removing the contamination
  - Is easy to implement with no adverse short-term impacts
  - Is more cost-effective than other technologies/process options that were screened as part of the Feasibility Study
  - Is more effective than Alternative 1

Preferred Clean-up Alternative (cont)

- The estimated total volume of contaminated soils to be excavated is 57 bank cubic yards, or 86 tons.
- Soil sampling will be completed to confirm results meet applicable clean-up levels and excavation will continue until clean-up levels are achieved.
- Implementation of this action may result in short-term impacts, such as minor fugitive dust emissions; however, these will be mitigated by the planned duration of less than one week to complete the work. Potential problems would be eliminated using appropriate engineering controls, such as water spraying for dust or erosion and sediment control, as needed.

Land Use Controls

LHAAP-03 is a smaller site located within the footprint of site LHAAP-35A(58)



LUCs will:

-Prevent human exposure to groundwater contamination presenting an unacceptable risk to human health and the environment

-Ensure no use of groundwater beneath the site for anything other than environmental monitoring and testing until levels of contaminants allow for unlimited use and unrestricted exposure

-These LUCs are applicable to sites within the boundary of LHAAP-35A(58), including LHAAP-03

A notification will be recorded at Harrison County Courthouse stating the site is suitable for non-residential use

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Public Involvement Process

1. Periodic updates during RAB meetings
2. Public notice published in Marshall Press and circulated via email to RAB and interested parties list
3. Public Comment Period – May 13 through June 12
4. Formal comments will be accepted either verbally during this meeting or via email or mail
5. Responsiveness Summary – Army will provide responses to formal comments received during the comment period as part of the Record of Decision for the site

Planned Schedule

1. Public Comment Period – May 13 through June 12
2. Public Comments Due June 12, 2013
3. Responsiveness Summary – Army will provide responses to formal comments received during the comment period as part of the Record of Decision for the site by late summer 2013

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Questions?

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TRANSCRIPT OF PUBLIC MEETING

CONCERNING LONGHORN ARMY AMMUNITION PLANT PROPOSED PLAN
FORMER WASTE COLLECTION PAD, BUILDING 722-P PAINT SHOP
LHAAP-03

MAY 29, 2013, 6:00 PM - 7:30 PM

HELD AT:
KARNACK COMMUNITY CENTER
15593 FM 134, KARNACK, TEXAS

P R O C E E D I N G S

(May 29, 2013)

JOHN LAMBERT: My name is John Lambert. I'm with the Corps of Engineers. And our contractor, the Army contractor, AECOM, will be presenting the proposed plan for a selection of a preferred clean-up alternative for the former waste collection pad at Building 722-P, paint shop.

Rose Zeiler, Dr. Rose Zeiler, the BRAC Installation Manager, could not make it tonight, so I will introduce Dave Wacker, from AECOM, to present the proposed plan.

DAVID WACKER: Thanks, John. Thank you guys for coming here today.

I know we meet periodically just to go over quarterly updates and sometimes for these proposed plan public meetings.

But this is one is for site LHAAP-03, former waste collection pad at Building 722-P, paint shop.

So what I'm going to talk about -- and feel free to stop me at any time. We're a very small group, so I'd like this to be informal. It doesn't have to be just me talking at you.

But what we plan to talk about is the

site location and then the -- the Comprehensive Environmental Response Compensation and Liability Act, Environmental Investigation and Remediation Process. We'll talk a little bit about the site history for LHAAP-03, a summary of the technologies we screened and the clean-up alternatives evaluated for the site.

We'll go over the nine CERCLA criteria that were used to evaluate the clean-up alternatives, and then we'll talk about the preferred clean-up alternative and a little bit more about the public involvement process under CERCLA and then the plan scheduled for this site.

So LHAAP-03 is a relatively small-looking site. I'm not sure if you can see it on the projection. But on this map over here on the wall, you can see the notation of the Site Number 3, and it's this figure right here, this shape pointing to right here. So that's where Site 3 is located. It's just a little ways up from the fire station, if you're familiar with how that goes, how the site's located.

So for this site, Site 3 is a small site located within a bigger site. We'll talk a little bit more about that later. But Site 58, for the Army, encompasses multiple sites. And so we're addressing the soil for Site 3 today.

The bigger site, Site 58, already has a Record of Decision and a remedial design and a draft remedial action work plan in place.

So the LHAAP-03 site location, you can see on the projection, it's a map that I also have a hard copy of, which is a little easier to see here. But that shows you the location of the paint shop. And the shape you see here is essentially the area of contaminated soil that we're planning on cleaning up.

So it also shows some -- where we've done some soil investigation, collected some soil samples, and where we have some monitor wells for sampling of groundwater.

CHARLES DIXON: Are you talking about digging the soil out?

DAVID WACKER: Yes.

CHARLES DIXON: Which area is that?

DAVID WACKER: This is the former building. These are former buildings located at the site. And then this blue shape with the hash through it --

CHARLES DIXON: Yeah.

DAVID WACKER: -- that's the area that we're talking about.

CHARLES DIXON: Okay.

DAVID WACKER: And if you see over here, it gives you a scale of how big that is. And so this -- this distance here says it's about 16 feet. So really if you put that up here, you're talking -- the area of excavation is approximately maybe 30 by 40 feet, something like that. So really it's a pretty small site, maybe even less than the size of this room we're in right now.

So you guys have both been to several of the last meetings, so -- the investigation and remediation process is on this poster. And essentially there's initial investigations with sampling that we'll talk about a little bit more that goes on. Then they do -- we do investigation, get to the final nature and extent of the contaminants that are out there.

We do a feasibility study, which tells us what clean-up alternatives are appropriate for the site, and then we do the proposed plan, which is where we are at right now, when that gets presented to the public.

After that, the public, you guys have the opportunity to provide comments, and those comments will become part of the Record of Decision, and the Army will provide answers to those comments, whatever they may be.

So that will all be inside the Record of Decision. The Record of Decision is signed off on then by the EPA and the TCEQ and the Army. And following on that, then we do the construction for the remedy, so we do whatever construction is required.

And at times, if it's a groundwater issue, there will be operation and maintenance like we have a groundwater treatment plant for other sites on the plant. And then the ultimate goal is to get the site complete. And for soil only, like Site 3, is -- we're hoping to get the site complete with this action.

JUDY VANDERVENTER: So where did y'all start in this process, since y'all have come in later? Was the process already started before y'all came on board?

DAVID WACKER: Yes. The process was started before we took over. We wrote basically a feasibility study for this, and we've written the proposed plan. So those are the two that we've done.

That feasibility study, actually there's a copy of it on the back table over there, and if you'd like to take a look at it, you're welcome to.

Anything else?

Okay. As far as the history of the site goes, it's the former waste collection pad near the paint shop. It was a waste collection site. Once the waste was put there and once it was full, it was moved to another location.

But it was basically a 55-gallon drum on a gravel pad inside a shed. And they would put heavy metal-based primers, waste paint, solvents, anything in there. Once it was full, then they would move it to a different location.

So metals in the soil is the contaminant of concern for the site. And we're estimating that there's between 50 and 150 cubic yards. That's how much is encompassed by that shape that we're going to have to dig and haul, excavate out.

So this slide shows the previous investigations. As you can see really, since 2006, there have been multiple sampling events where they've gone out to identify. In 2006, four soil samples collected, in August.

In September, they went back out and checked another one. So iteratively, over the last five or six years, they've tried to come to better terms on what the actual contamination was, extent of contamination.

So the primary risk at the site is a risk to groundwater quality from lead and arsenic, which are metals in the soil. There's no unacceptable risk from the soil itself, but the potential for the lead and arsenic to leach into the groundwater is the issue.

And also a baseline ecological risk assessment was completed that included this site, and there wasn't any unacceptable risk to ecological receptors.

So the remedial action objectives and the remediation goals. The remedial action objective for LHAAP-03 is to protect human health and the environment by minimizing the potential for leaching of the lead and arsenic from the impacted soil into the groundwater.

And the remediation goal for the contaminants, you can see there, for arsenic, 5.9 milligrams per kilogram, and lead, 180 milligrams per kilogram.

So a summary of the technology processes screened. This is -- you might have to -- if you want to see this a little better, we might have to talk after. And you have it in there, too?

CHARLES DIXON: Page 6.

DAVID WACKER: Okay. Page 6 of the proposed plan has these technologies that we're screening.

Essentially --

CHARLES DIXON: This is alternate -- alternatives.

DAVID WACKER: Okay.

CHARLES DIXON: That's not the same, is it?

DAVID WACKER: No. And let me spend a minute and talk about the difference.

The last couple of public meetings we've had have been for Site 47 and Site 4. And like Site 47, if you recall, is groundwater contamination over a large area and multiple different contaminants. And so there are different technologies that can be used to clean up that groundwater, different ways you can do it. And so those are evaluated in the feasibility study and then carried forward into the proposed plan as alternatives.

For this site, really, because in the feasibility study -- which right before this proposed plan action, we screened technologies to see what potentially could we do with this soil, what's appropriate.

And there are several others you can use for soil. You can do containment, which, like the landfills that we have, those are sites for us here, and they've used containment, putting a cap over it as the -- as one of the alternatives. Well, that was evaluated in the feasibility study and determined for this small, little, you know, 20-by-30-foot area, it's not -- it wouldn't be worth it to put a cap over it that you'd have to mow and maintain and continue potentially to have to sample and that kind of thing.

Similarly, some kind of treatment and/or immobilization is another one that could have been used. Those were screened in the feasibility study also, and determined because of cost -- immobilization means making sure that none of the contaminants can move from where they're at. And that can be completed, but the cost to do that for such a small area, it's not necessarily economically feasible. So that wasn't carried forward into the proposed plan.

So that's why we wanted to talk about screening technologies in this one, because for the other public meetings we've had, we've had multiple alternatives. But for this public meeting, we really only evaluated two alternatives, because the rest of them were screened out and found to be not appropriate in the feasibility study.

So does that make sense?

So the alternatives that were evaluated are -- or the screening of technologies that was done, that eliminated everything really except for digging and hauling the soil, or the no action alternative, which CERCLA makes us evaluate what the impacts of having no action are also.

So those are the two alternatives that we carried forward to evaluate: The no action alternative and then excavation and offsite disposal of the soil.

So another poster we have over here, which we've had at several other meetings basically, is that the -- the nine criteria used to evaluate the alternatives.

It's overall protection of human health and the environment; compliance with applicable and relevant or appropriate requirements; long-term effectiveness; reduction of toxicity, mobility or volume through treatment; short-term effectiveness; implementability; cost; and then State acceptance -- or agency acceptance and community acceptance.

So that's what we run through with the alternatives that we carry forward for clean-up.

CHARLES DIXON: I have a question about the arsenic. I'm assuming the lead is from lead paint. But where does the arsenic come from?

DAVID WACKER: Well, similarly, paints contain all sorts of metal compounds.

CHARLES DIXON: The function or something?

DAVID WACKER: It's a -- it's a function

of the materials used from the manufacturer of the paint to have multiple metals associated with them, that includes the lead and the arsenic. And through various processes and in association with chemicals, they can be released from that paint and come to reside in the ground, and/or they could be paint chips.

You know, paint chips, things that get chipped off or -- you know, are reduced to particulates, small volume, can get into the soil also, and from that, potential to come into contact with water through rain, precipitation or some other leak or spill, that can leach down into the groundwater. But it's a function of the materials that contain multiple different metals.

And out of this assessment, there's probably 20 or so metals that we typically, when you analyze a sample for metals, you get results for, and usually you'll have results for almost all of them. Because they're even present in the soil, a lot of the metals are.

So at times there's discussions back and forth as to whether some of these compounds aren't naturally occurring in soil as opposed to being related to a release from a contaminant. But for this one, the two that are remaining after all of our assessments were arsenic and lead.

CHARLES DIXON: Yeah.

DAVID WACKER: I don't believe -- I don't want to speak out of turn. John, you're going to have to help me out.

The human health criteria for lead is 400 milligrams per --

JOHN LAMBERT: One of the models -- it is 400 for residential.

DAVID WACKER: 400 for residential.

JOHN LAMBERT: I think it's 800 for industrial, or something like that.

APRIL PALMIE: Like if you eat the dirt scenario.

JOHN LAMBERT: It's a kinetic uptake model.

DAVID WACKER: So our clean-up objective is, again, 180, so we're being relatively conservative, I think, in how we're approaching it.

JOHN LAMBERT: But again, primary exposure pathway is not direct contact with the soil. It's the concern for leaching from the soil to groundwater.

DAVID WACKER: Right.

Okay. So the excavation and offsite disposal alternative. I think -- hold on just one moment.

So Alternative 1 is the no action alternative, and no action means what it says. It means that you don't do anything to address it. You just leave the contamination in place. So typically we don't analyze that very much, because it is, on the face of it, what it is; you're taking no action.

So Alternative 2 here we're discussing is excavation and offsite disposal.

If you excavate and take away the contamination, it's protective of human health and the environment. It complies with the appropriate requirements. It's expected to achieve the remedial action objectives. And I'll go through how we're doing that here in a little bit.

Because it's a small volume, it's efficient, quick and effective at removing the problem.

And there are very few short-term impacts. The duration of the activity is probably going to be three or four days -- that's it -- to finish it.

And it's more cost effective than the other technologies that were evaluated in the feasibility study that we didn't carry forward. So that makes it advantageous, too.

So, again, we say here that the volume of contaminated soil is expected to be about 57 bank cubic yards, or 86 tons. But soil sampling is going to be completed to confirm the results. So what will happen is, the first step will be for us to go out and identify what this box is that we need to clean up.

So we'll have to go out and collect soil samples to tell us exactly where this box is. Once we do that and get the results, find out that -- where we could initiate our excavation, we'll go out and we'll direct-load excavate, most likely, or we'll excavate into roll-off containers, one or the other, and we'll excavate until we reach the limits of this boundary. And then we'll have to collect confirmation samples to confirm that we're at or below the clean-up objectives that we need to be.

So we'll have some downtime while we go get the samples analyzed, get the results back. If say, for example, we're good on all three sites here but we've got a problem over here, then we'll need to step out and excavate some more material on this side, take another confirmation sample, and actually -- we're required to do that iteratively until we meet the remediation goals.

So as you can imagine from digging and hauling soil, there may be some dust emissions from that. There could be some traffic, if we have several trucks running. But I believe these are short-term, and I don't think it will be a real problem.

If we have too much dust, we'll use some water spraying to keep it down. And if -- there shouldn't be any need for sediment control. This isn't going to be a long-term operation, and we don't really plan on doing it. When we've got a couple of rainy days together, we'll try and choose some time when we have some good days.

In completing the actual work, we still have to do a work plan after, you know -- you see the steps that -- we have to do a ROD and a work plan. So when the actual work will take place is probably fall timeframe, optimistically.

So, Land Use Controls. Again, I don't have a better map of this. This map here shows it a little better. I said at the beginning that Site 3, which is here, this area here, lies within a larger site, Site 58.

This is the Land Use Control boundary for Site 58. So this is a little hard to see. But there are several other sites located within here. So they're all being dealt with together as far as the Land Use Controls go.

And in the blue boxes there, you can see the Land Use Controls are intended to prevent exposure to the groundwater contamination, ensure that there's no use of the groundwater onsite for anything other than the testing we need to do for -- for environmental testing, until we are sure the levels of contaminants are below the clean-up objectives.

And so -- also the final Land Use Control is really the site is not suitable for -- or is suitable for nonresidential use.

Okay. So you're familiar with this, pretty much, how you guys are involved in the process. We have quarterly RAB meetings. We published the notice in the Marshall Press and we circulated via email.

The public comment period for the LHAAP-03 site is May 13th through June 12th. The proposed plan, which you probably got a copy of as you walked in the door, has been available at the Marshall Public Library, I think, since the first week of May, before the May 13th date. But it's been available there since that time.

And then formal comments. You can provide those verbally as part of this meeting. They will become part of the transcript here with the court reporter that we'll have, and we also have received some comments from George Rice representing Caddo Lake Institute, and those will be part of the Responsiveness Summary in the ROD also. You guys probably got emailed those separately, I imagine.

And then again, the Responsiveness Summary, any questions we have that are received during the comment period will be answered, and they will be answered in the Record of Decision.

Schedule-wise, again, May 13 through June 12 is the public comment period. Comments are due on June 12th. And we intend for late summer, for that Record of Decision to be published, including the Responsiveness Summary, or the answers to the questions.

And that was probably pretty quick.

So any questions that you have or if you want to talk about the screening of the technologies or -- as much as I know or any of the folks here -- the other people who are here, government representatives, so we all might be able to add some detail to --

JUDY VANDERVENTER: In reading George Rice's comments -- have you read these yet?

DAVID WACKER: Yes, ma'am.

JUDY VANDERVENTER: That comment about the lead clean-up level, what is going to be y'all's response to that?

DAVID WACKER: Well, we don't have a final response. We just got the comments yesterday.

JUDY VANDERVENTER: Oh, okay.

DAVID WACKER: We were talking about it earlier today. I don't know --

Gretchen, do you want to talk about that? Gretchen is a geologist. Gretchen McDonnell is the Deputy Project Manager, as most of you know, for AECOM.

She's getting -- the document she's got is the feasibility study for the site. And so she's going to talk about, I guess, that comment a little bit.

GRETCHEN McDONNELL: Just to summarize what the comment was. George Rice at Caddo Lake Institute was concerned that one of the parameters to be used in a calculation to calculate a lead clean-up level was not appropriate.

He felt that the number that we used to describe how well the lead would travel through the subsurface, through the soil, he felt that the number that we used wasn't correct there. Because the number that we used came from the TCEQ table, and it was for clayey soils, which primarily at the site, they're down about 14 feet. That's what you've got is really clayey soils there. And that's where the lead is actually found, not just from the top half but all the way down to about 7 feet, in about three spots. Down to about 7 feet you can find lead that we need to get out of there. So that's why we used the concentration, the Kd -- the Kd level.

JUDY VANDERVENTER: Even though there were other soil types there?

GRETCHEN McDONNELL: The soil that contains the lead that we were concerned about shedding out to the groundwater is clayey soils.

DAVID WACKER: And I think I forgot to mention something, too. I mentioned the excavation area, but the excavation depth for this location is basically two feet. So we're going down about that far over this entire area. And then in these little boxes that we've identified, we need to go down to about eight feet. So, again, I think she's going to show you some of the soil results around that area.

GRETCHEN McDONNELL: This boring right here, these are right actually in the site area. You can see these top layers with the hashmarks. That indicates either a fat clay, which is a plastic clay, or a leaner clay, which is a less plastic clay. But still very clayey soils down to about 15 feet below ground surface. And that is the area that we're looking at bringing the lead out of it.

And then in the surrounding soil, even off the Site 3 boundary, you're looking at very clay-rich soils in those top levels.

There are a couple of locations out here, farther away from the site, where you've got some kind of clayey clay materials, or sandy clays, but it's still -- still quite clayey material, but really what we're looking at is the lead-contaminated soils are clays. And that's why we chose that particularly Kd for the clays.

JUDY VANDERVENTER: And then the second was the extent of the contaminated soil. There are no soil borings to the northwest or southwest of the zone known to contain contaminated soils.

DAVID WACKER: And I -- this is probably still a good diagram to use for that. And I think what he was saying is that he thought we ought to have some -- a sample here and a sample here. You said northwest and southeast?

JUDY VANDERVENTER: Uh-huh.

DAVID WACKER: And so again, the first step, when we go out there -- there's -- it was on the screen. We did have multiple iterative times when they've gone out to collect samples. But as part of the clean-up, when we go out there, we have to again define what this box is.

So the first thing we're going to go do is collect soil samples to tell us where we need to draw this box. So it's -- I don't know that it's necessarily apples and oranges, but if he's requesting that we go through another investigation step and actually go collect samples and then come back to do that, I don't think that --

JUDY VANDERVENTER: He just says sample at least two more soil borings, one to the northwest and one to the southeast, he's just saying you should do.

DAVID WACKER: And I guess -- again, we don't have the final response put together. But the thought right now is that we will be going back to collect soil samples -- soil borings to tell us where to draw that box, yeah.

JOHN LAMBERT: And then a second round actually, Dave. Because after you do the excavation, you've got to confirm. So they've got to find the outer limits of soils below the clean-up level that is presented.

So there are two rounds. There's the initial defining of the box; they do the excavation; and confirmation. That's a second round of samples to show they've got it all.

APRIL PALMIE: From the sides of the excavation and from the bottom.

RICH MAYER: From the bottom, yes.

DAVID WACKER: Yes, that's right. And he has another comment, but I don't remember what it was.

JUDY VANDERVENTER: Well, there was two.

AARON WILLIAMS: I think the third one is concurrence.

DAVID WACKER: Oh, I like those.

JUDY VANDERVENTER: That was his only two. Yeah, once or twice he said that's -- you know, that's what should be done. But that was his only comment, so that's what I was concerned about, how y'all were going to respond to that.

DAVID WACKER: Again, I mean, at some of the other sites, if you're -- if this distance is 2,000 feet instead of 16 feet and you only had a couple of samples, I could see where maybe you might want to have some more coverage to fill that gap.

But there are -- we're talking distances between these of three or four feet -- three or four feet. So putting another one in there in addition to what we're already planning, which is two times, to sample may be -- that's a lot.

Well, that's all I had in my bag of

tricks.

I appreciate you guys coming out. I know this is a pretty straightforward and simple site.

RICH MAYER: Thank you, Dave.

DAVID WACKER: Anything else as far as the meeting goes?

John, you were saying something about we need to hold off closing out, or are we --

JOHN LAMBERT: No. We -- I don't know what the rule is, if we said 6:00 to 7:30 --

AARON WILLIAMS: In case other public show up.

JOHN LAMBERT: You don't need to go through a presentation again, but you need to be available again, I think.

DAVID WACKER: That's fine. Do we need to hold Keith, or is he good to go?

JOHN LAMBERT: I'm not sure. The court reporter, for a transcript, does he need to stay in case someone else came? I mean, this was the formal presentation, and the questions were asked. If the presentation ends and someone walked in later and informally asked questions, would we need to capture that on the transcript?

RICH MAYER: I guess you would.

JOHN LAMBERT: I think so. We need to be conservative with that.

DAVID WACKER: Shall we close the public meeting and stop recording? And then if someone else comes, then we'll kind of start back up.

All right. Thank you for coming tonight.

RICH MAYER: Thank you, Dave.

--ooOoo--

STATE OF TEXAS *

COUNTY OF SMITH *

I, D. KEITH JOHNSON, CSR, RDR, CRR, CCP, do hereby certify that the above and foregoing contains a true and correct transcription of all of the proceedings which were reported by me.

WITNESS MY OFFICIAL HAND this the 7th day of June, 2013.

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40 (1) 5:5
400 (3) 13:6,8,9
47 (2) 9:7,7

5

5.9 (1) 8:12
50 (1) 7:9
55-gallon (1) 7:2
57 (1) 15:1
58 (4) 3:23 4:1 16:20 16:22

6

6 (2) 8:19,20
6:00 (2) 1:13 24:10

7

7 (2) 20:1,2
7:30 (2) 1:13 24:10
722-P (3) 1:10 2:8,19
7th (1) 26:7

8

800 (1) 13:10
800)666-0763 (1) 26:13
86 (1) 15:2

LONGHORN ARMY AMMUNITION PLANT
Karnack, Texas

MONTHLY MANAGERS' MEETING

Minutes

DATE:	June 20, 2013
TIME:	2:00 p.m.
PLACE:	**Teleconference – 866-203-6896, passcode 1759304791**

Welcome **RMZ**

Attendees:

Army BRAC:	Rose Zeiler
EPA:	Rich Mayer, Kent Becher, Barry Forsythe
TCEQ:	April Palmie, Dale Vodak
USACE:	Aaron Williams
USFWS:	Paul Bruckwicki
AECOM:	Dave Wacker, Gretchen McDonnell, Josh Miller, Marwan Salameh
AEC:	Robin Paul, Marilyn Plitnik

Action Items
AECOM

- Submit proposed 2013 groundwater monitoring schedule for Army and agency review. **Complete.**
- Compile interim data submittal for the next MMM. **Complete.** This item was submitted to the group along with the invitation for this meeting. Another interim data package focusing on LHAAP-18/24 is planned for prior to the next Monthly Managers' Meeting.
- Submit Field Standard Operating Procedures to agencies by June 19th. **Pending.** Currently under Army review. Army plans to have all SOP comments back by 1st week in July. Priorities for EPA review are well development, DPT, well installation, groundwater sampling.
- Submit repackaged IWWP to agencies by mid-July. **Pending.** Working toward mid-July to the agencies.
- Add repackaged IWWP document submittal to the document tracker table. **Complete.**
- Include review and submittal milestone dates in the transmittal letter for the draft 5-Year Review Report. **Pending.**
- Provide input on potential nutrient impacts from the GWTP. **Complete**. Submitted with the invitation for this meeting.

Army

- Work with APG to arrange LHAAP-37 Bioplug presentation for September/October RAB meeting. **Complete.**
- Combine decision documents for LHAAP-19 and LHAAP-56, -65, and -69 before returning them to TCEQ, for TCEQ staffing purposes. **Pending.**
- Army to submit four SOPs (well installation, well development, well sampling, DPT) by the end of June.

EPA

TCEQ

AEC

Defense Environmental Restoration Program (DERP) PBR Update **AECOM**

- Upcoming document submissions to regulators (see Document and Issue Tracking table)

Item 1 (Nutrient Issue for Harrison Bayou in INF Pond) - Mr. Salameh provided a review of conclusions from his document titled “Analysis of Harrison Bayou Water Quality for Surface Discharge Considerations”, which was provided to the group earlier in the week. See attachment. TCEQ requested a table showing discharge and the nutrient levels associated with that discharge. TCEQ would like to revisit nutrient levels in a couple of quarters to see whether FBR feeding optimization has reduced nutrient levels in treated water. AECOM will provide a summary of the treated water nutrient data in October, after FBR feeding optimization has been implemented.
.

Item 2 (LHAAP-04 ROD) – A redline version showing all changes in response to agency comments has been submitted to agencies. EPA has an additional comment on Table 2-4 and TCEQ will submit any additional comments by the end of the day. Those final comments will be addressed and the Draft Final document will be issued today.

Item 3 (LHAAP-03 ROD) – Due to agencies at end of month. Public comment period ended June 12th.

Item 4 (LHAAP-47 Draft Final ROD) – Ms. Zeiler will likely request a 20-day extension on this document to allow time for a teleconference between Army and agencies to discuss responses to agency comments. Army will work to finalize a teleconference for July 1st or 2nd.

Item 5 (LHAAP-58 Draft RAWP/TS – TCEQ and EPA comments on the Treatability Study should be received by June 24th.

Item 6 (Explanation of Significant Differences) – Planned for submittal to agencies in July.

Item 7 (GWTP Quarterly Report) – Planned for submittal to agencies in July.

Item 8 (IWWP and SOPs) – discussed earlier in meeting

Item 9 (LHAAP-46 RAWP) – In progress. Due to agencies at end of July.

Item 10 (LHAAP-67 RAWP) – In progress. Due to agencies at end of July.

Item 11 (5 Year Review) – All Army comments should be submitted by next week, and the document will be submitted to the agencies shortly after.

Item 12 (Monthly Managers’ Meeting) – Meeting action items have been added to the Document and Issue Tracking table for visibility.

Item 13 (LHAAP-37 DF RAWP) – Planning for this field work is in progress. July through September work schedule planned.

Item 14 (LHAAP-50 DF RAWP) - Planning for this field work is in progress. July through September work schedule planned.

Item 15 (LHAAP-17 RD WP) - Placeholder

Item 16 (LHAAP-29 PSI WP) - Placeholder

Item 17 (LHAAP-16 RD WP) – Placeholder

Item 18 (July RAB) – Next meeting is scheduled for July 16th at 6PM. Minutes from the April RAB meeting are in Army Review.

Item 19 (GWTP O&M/Air Monitoring) - INF Pond earthwork repair, topsoil and seeding have been in place for approximately 3 weeks. Seeding is being irrigated.

Item 20 (Admin Record Update) – Will be in Army review tomorrow. The three FFA parties (Mayer, Palmie and Zeiler) agreed that dispute-related correspondence will be added to the Administrative Record at the end of the year to keep all documents relating to that subject together in the record. It was discussed that if there is a request in the interim, it will be handled as a separate issue and provided independent of the Administrative Record.

Item 21 (BERA Addendum Work Plan) - Comments from agencies are expected by July 10th. Mr. Williams will provide Mr. Wacker with dates to be added to the BERA items on the Document and Issue Tracker.

Item 22 (BERA Field Work) – Will likely follow within a month of agency approval of the BERA Work Plan.

Item 23 (BERA Addendum) – placeholder

Item 24 (LHAAP-18/24 Data Gap Report) – In progress. IDW management related to the data gap investigation work is under way.

- Upcoming field work
  Mr. Mayer advised that EPA would be observing the next groundwater sampling event.
- Monthly data - discussed previously
- Quarterly reports - discussed previously
- Groundwater Treatment Plant
  - Air Monitoring - discussed previously
  - INF Pond Topsoil and erosion control status- discussed previously
  - GWTP Longer-Term Plan – no update

Other DERA Program Update **Army**

- Status of Supplemental BERA - discussed previously
- Five Year Review Report Update - discussed previously
- Sitewide LUC Management Plan – annual update. Finalized document has been submitted to the agencies.

MMRP Update **Army**

- Update – no update

Other Environmental Restoration **Army**

- CRP/CIP Update – Ms. Zeiler sent a reminder to the RAB members to submit their comments. Mr. Fortune has replied with no comments. CLI-TAG will likely provide comments.
- Site 19 Decision Document update - - discussed previously
- Decision Documents for multiple sites – status update- discussed previously
- Site 37 Bioplug – Presentation planned for October RAB meeting.
- 1,4-dioxane sampling at Longhorn – EPA chemist has expressed interest in speaking to the lab used by AECOM for these analyses and has asked for contact information. Next round of 1,4-dioxane sampling will be conducted in approximately the third or fourth week in August. AECOM will add this sampling to the 6-month outlook schedule and redistribute the schedule. AECOM will review the dates of future sampling events for accuracy.

Programmatic Issues **RMZ/RM/AP**

- Status of Dispute – no update

USFWS Update **RMZ/PB**

- Environmental Restoration Issues with Transfer Schedule Impact – None
- USFWS Comments on Documents – none

Schedule Next Managers' Meeting

The Next Monthly Managers' Meeting is scheduled for July 16, 2013 at 11AM at the LHAAP Army Trailer. Those not attending in person will be included by teleconference.

RAB meeting is scheduled for July 16, 2013 at 6PM. Mr. Becher requested a 10-minute block of time to present results of recent split-sampling events.

Adjourn

New Action Items

AECOM

- AECOM will provide a summary of the treated water nutrient data in October, after FBR feeding optimization has been implemented.
- AECOM will add the next round of 1,4-dioxane sampling to the 6-month outlook schedule and redistribute the schedule. AECOM will review the dates provided for future sampling events for accuracy.

ARMY

- Army will work to finalize a teleconference to discuss responses to agency comments on LHAAP-47 Draft Final ROD for July 1st or 2nd.
- Mr. Williams will provide Mr. Wacker with dates relating to BERA items, for inclusion in the Document and Issue Tracking table.

Attachments

Analysis of Harrison Bayou Water Quality for Surface Discharge Considerations

ACRONYM LIST

AEC	**United States Army Environmental Command**
AECOM	**AECOM Technology Services, Inc.**
AP	**April Palmie**
APG	**Aberdeen Proving Grounds**
BERA	**Baseline Environmental Risk Assessment**
BRAC	**Base Realignment and Closure**
CLI – TAG	**Caddo Lake Institute – Technical Assistance Grant**
CRP/CIP	**Community Relations Plan / Community Involvement Plan**
DERA	**Defense Environmental Restoration Act**
DERP	**Defense Environmental Restoration Program**
DF	**Draft Final**
DPT	**Direct Push Technology**
EPA	**United States Environmental Protection Agency**
FBR	**Fluidized Bed Reactor**
GWTP	**Ground Water Treatment Plant**
IDW	**Investigation Derived Waste**
INF	**Intermediate-Range Nuclear Forces**
IWWP	**Installation-Wide Work Plan**
LHAAP	**Longhorn Army Ammunition Plant**
LUC	**Land Use Controls**
MMM	**Monthly Managers' Meeting**
MMRP	**Military Munitions Response Program**
O&M	**Operation and Maintenance**
PB	**Paul Bruckwicki**
PBR	**Performance-Based Remediation**
POC	**Point of Contact**
RAB	**Restoration Advisory Board**
RAWP	**Remedial Action Work Plan**
RD	**Remedial Design**
RM	**Rich Mayer**
RMZ	**Rose M. Zeiler**
ROD	**Record of Decision**
SOP	**Standard Operating Procedure**
TCEQ	**Texas Commission on Environmental Quality**
TS	**Treatability Study**
USACE	**United States Army Corps of Engineers**
USFWS	**United States Fish and Wildlife Service**
WP	**Work Plan**

Analysis of Harrison Bayou Water Quality for Surface Discharge Considerations

Historically, the State of Texas has not had numerical criteria for nutrients in their surface water quality standards. In Texas, nutrient controls have taken the form of narrative criteria, watershed rules, and antidegradation considerations in permitting actions. The Texas Commission on Environmental Quality (TCEQ) is now conducting additional studies and evaluations to develop potential numerical nutrient criteria for selected streams, rivers, and estuaries in Texas. Numerical criteria for these other types of water bodies will also be developed and considered with extensive public participation.

The information presented below was obtained from most recent TCEQ regulations and guidance to assess water quality conditions of Harrison Bayou (HB) and determine whether numerical limits on nutrient loads should be considered. To accomplish this task, HB watershed was evaluated and the information is presented below. **Figure 1** (Data Server for Caddo Lake - online) provides a map of Caddo Lake watershed associated with HB. **Figure 2** provides a summary of the information presented in this document.

Designated Segments (30TAC§307.10(3))

HB is not a designated segment by the TCEQ. However, there are 10 designated segments in the watershed area associated with HB such as Caddo Lake, Lake O' the Pines, and Lake Cypress Springs.

Site-specific Uses and Criteria for Classified Segments (30 TAC §307.10(1))

Site-specific uses for classified segments including recreational, aquatic life, and domestic water supply. The majority of classified segments are identified to be suitable for recreational, aquatic life, and domestic water supply uses. The criteria for classified segments include pH, temperature, and chloride, sulfate, total dissolved solids (TDS), dissolved oxygen (DO), and indicator bacteria concentrations.

Site-specific Uses and Criteria for Unclassified Water Bodies (§307.10(4))

HB is not a classified segment and is listed under unclassified segments in §307.10(4). The water bodies are included in §307.10(4) because a regulatory action has been taken or is anticipated to be taken by the TCEQ or because sufficient information exists to provide an aquatic life use designation. In the table below, the segment numbers listed refer to the designated segments as defined in §307.10(3). The water body is a tributary within the drainage basin of the listed segment. The description defines the specific area where the aquatic life use designation pertains. Generally, there is not sufficient data on these waters to develop other conventional criteria and those criteria are considered the same as for the segment where the water body is located unless further site-specific information is obtained.

Segment	County	Water Body	ALU	DO	Segment Description
0401 (Caddo Lake)	Harrison	Harrison Bayou (0401-02)	High	≤ 5.0	*Intermittent stream with perennial pools from the confluence with Caddo Lake within the Caddo Lake National Wildlife Refuge* (also known as the Longhorn Ordinance Works facility) *east of the City of Karnack upstream to FM 1998 east of the City of Marshall*

ALU – aquatic life use [The establishment of numerical criteria for aquatic life is highly dependent on desired use, sensitivities of aquatic communities, and local physical and chemical characteristics. Six subcategories of aquatic life use are established. They include minimal, limited, intermediate, high, and exceptional aquatic life and oyster waters.]
DO – dissolved oxygen [The characteristics and associated dissolved oxygen criteria for limited, intermediate, high, and exceptional aquatic life use subcategories are indicated in §307.7(b)(3)(A)(i) [Table 3].]

Sole-source Surface Drinking Water Supplies (§307.3)

The Caddo Lake watershed was assessed for sole-source drinking water supplies. Sole-source protection zones of sole-source surface drinking water supplies are defined in §307.3 (relating to Definitions and Abbreviations). The table below identifies sole-source surface water supplies in this watershed and all of these water supplies are not influenced or associated with HB.

Water Body Name	County	Segment No.
Big Cypress Creek below Lake O' the Pines	Harrison	0402
Lake O' the Pines	Marion	0403
Lake Cypress Springs	Franklin	0405
Lake Bob Sandlin	Camp, Titus	0408

Analysis of Nutrient Criteria (RG-194 draft 2011)

The following information pertains specifically to analysis of whether HB has numerical nutrient criteria.

The TCEQ has included numerical criteria for nutrients in major reservoirs in the Standards. The criteria are based on historical chlorophyll a data from the main body of selected reservoirs. The TCEQ plans to develop nutrient criteria for streams and rivers, estuaries, and wetlands and evaluate them for inclusion in a future Standards revision. However, these standards currently do not exist.

Only Lake Cypress Springs (Segment 0405) in the watershed associated with HB has a chlorophyll a nutrient criteria of 17.54 ug/L (§307.10(6) Appendix F). Note that no other segment within Caddo Lake watershed has numerical nutrient criteria.

The nutrient screening procedures constitute the basis for the antidegradation review(s) for nutrients ("Antidegradation" on page 55 of RG-194). For streams or rivers, the screening is performed regardless of the permitted flow size to evaluate local effects under the narrative provisions of the Standards. Hence, local effects need to be evaluated for discharges to HB.

Nutrient Screening for Streams and Rivers (Page 47 of RG-194 Draft 2011)

To assess local effects in streams and rivers from discharges under the narrative nutrient provisions of the Standards, the TCEQ first evaluates the discharge using the general guidelines. For HB, general guidelines are not applicable because no change in HB characteristics downstream of discharge point is observed.

If the general guidelines in this section indicate that a total phosphorous (TP) limit should be considered, then the TCEQ conducts a more comprehensive review using site-specific screening factors. Eutrophication potential is rated as a low, moderate, or high level of concern for each factor. Some screening factors can be rated on either qualitative or quantitative information, depending on data availability. Not every factor is always appropriate or definable at a particular site.

These screening procedures are primarily intended for freshwater streams and rivers. If a stream or river changes characteristics downstream of the discharge such that eutrophication impacts might be greater in downstream areas, then screening procedures are also applicable to those downstream reaches. As a rough guide, nutrient screening procedures are typically applied for the following permitted discharge sizes within the following distance of the discharge point:

Permitted Flow (mgd)	Evaluation Distance (downstream miles)
< 0.25	< 3
0.25 to < 1.0	< 7
≥ 1.0*	< 15

*Very large discharges may be evaluated on a case-by-case basis.

General Guidelines for Assigning TP Limits

TP limits are potentially indicated in the following situations:

- for new or expanding discharges with permitted flow ≥ 0.25 MGD to perennial, shallow, relatively clear streams with rocky bottoms or other substrates that promote the growth of attached vegetation;
- for new or expanding discharges with permitted flow ≥ 0.25 MGD to streams with long, shallow, relatively clear perennial impoundments; and
- where explicitly required by watershed rules or other specific regulatory requirements.

None of the above criteria apply to the Groundwater Treatment Plant (GWTP) at the former Longhorn Army Ammunition Plant (LHAAP) because the GWTP discharge flow rate is < 0.1 mgd; hence, the TP limits are not applicable to HB.

Site-Specific Screening Factors

Assessment of site-specific screening factors was conducted in the following sections to further evaluate the potential need for a TP limit to control instream vegetation growth in HB. These screening factors include the following:

A. size of discharge
B. instream dilution
C. sensitivity to growth of attached algae—type of bottom
D. sensitivity to growth of attached vegetation—depth
E. sensitivity to nutrient enrichment—water clarity
F. sensitivity to growth of aquatic vegetation—observations
G. sensitivity to growth of aquatic vegetation—shading and sunlight
H. streamflow sustainability
I. impoundments and pools
J. consistency with other permits
K. existence of listed concern for nutrients or aquatic vegetation in the TCEQ's integrated report (30 TAC § 305(b))

The level of concern (low, moderate, or high) for each of these factors is described in the table below. Calculations are based on 7Q2 stream flows unless otherwise indicated.

Site-Specific Factor	Level of Concern	Criteria	Selected Level of Concern
Size of discharge	Low	< 0.25	Low; GWTP discharge rate < 0.25 mgd
	Moderate	0.25 to 1.0	
	High	≥ 1.0	
Instream Dilution	Low	< 10	Low to Moderate; ratio of GWTP discharge rate to HB flow rate ≤ 15
	Moderate	10 to < 25	
	High	≥ 25	
Sensitivity to Growth of Attached Algae – Type of Bottom	Low	Mud or sand	Low; the bottom is mud with little to no rocks.
	Moderate	Rocky Cobble, gravel, usually with riffle areas	
	High	Larger rocks and boulders, rock slabs	
Sensitivity to Growth of Attached Vegetation	Low	Relatively steep banks and deep channels across stream	Moderate; HB banks are gently sloping with some shallow areas
	Moderate	Gently sloping sides with some shallow areas	
	High	Substantial shallow areas near banks and in stream channels	
Sensitivity to Nutrient Enrichment – Water Clarity	Low	Turbid from suspended particles or color (tannins), bottom may not be visible	Low; the creek bottom is not visible due to turbidity
	Moderate	Some visible turbidity but without heavy murkiness, bottom sometimes visible	
	High	Relatively clear water, bottom usually visible	

Site-Specific Factor	Level of Concern	Criteria	Selected Level of Concern
Sensitivity to Growth of Aquatic Vegetation – Observations	Low	Little attached, floating, or suspended aquatic vegetation	Moderate; limited patches attached, floating, or suspended aquatic vegetation are typically observed
	Moderate	Limited patches attached, floating, or suspended aquatic vegetation	
	High	Heavy patches of vegetation in areas with nutrient input	
Sensitivity to Growth of Aquatic Vegetation – Shading and Sunlight	Low	Extensive canopy cover shades most of stream surface	Low; canopy cover is extensive and shades most of stream
	Moderate	Substantial canopy cover, but shading is only partial and not equivalent to "deep woods"	
	High	Canopy cover diffuses light to some extent, but substantial light reaches stream surface	
Streamflow Sustainability	Low	Intermittent	Moderate; the stream is classified as intermittent with perennial pools
	Moderate	Intermittent with perennial pools	
	High	Perennial	
Impoundment and Pools	Low	No impoundments > 300 feet in length and no reach with extensive smaller pools	Low; HB has no impoundments > 300 feet in length or reaches with extensive smaller pools
	Moderate	No impoundments > 300 feet in length, but substantial smaller pools > 20% of affected reach	
	High	At least one impoundment > 300 feet in length	
Consistency with other Permits	Low	Similar permits usually do not have effluent limits for TP	Unknown but likely low; the GWTP is unique as it treats contaminated groundwater and not domestic or industrial wastewater; additionally, the flowrates are intermittent (no more than twice per week and do not occur in the summer with HB low flow conditions per iROD requirements) and much smaller than would be anticipated for a municipal or industrial dischargers
	Moderate	There are some similar permits with TP limits, but applicability is site-specific and not "across the board"	
	High	Discharges with similar characteristics usually have a TP limit	
Existence of Listed Concern for Nutrients of Aquatic Vegetation in the TCEQ's Integrated Report (§ 305(B))	Low	No concern for nutrients or aquatic vegetation in latest integrated report	Low; draft 2012 Texas Integrated Report [Texas 303(d) List as required under Sections 305(b) and 303(d)] identified Harrison Bayou as "depressed dissolved oxygen" since 2000 from Caddo Lake upstream 21.8 km (13.5 mi) to the confluence with NHD RC 11140306000177, an unnamed tributary approximately 2 km downstream from FM 1998; concerns for nutrients or aquatic vegetation in the latest Integrated Report were not listed
	Moderate	Concern for nutrients or aquatic vegetation in latest integrated report due to exceedance of the 85^{th} percentile	
	High	Concern for nutrients or aquatic vegetation in latest integrated report due to documented problem with one or both of these	

iROD – interim Record of Decision

Of the 11 criteria listed above, six or seven were considered as a low level of concern and three or four as a moderate level of concern with one factor unknown. Therefore, based on this assessment, the TP concern should be considered low for HB and no numerical TP limit for GWTP discharge would be necessary.

Conclusion

An assessment of the applicability of the Texas surface water quality standards (30 TAC §307) on the GWTP discharges to Harrison Bayou was conducted. This assessment was completed to determine whether specific numerical criteria for nutrients (in particular total phosphate) are applicable. Based on this assessment, it was determined that the rules are not applicable to HB.

Furthermore, site-specific screening factors were evaluated (though not technically applicable) for TP and the potential impact on HB was determined to be low.

Based on the GWTP discharge rates (< 0.025 mgd on average); the intermittent nature of the discharge (discharge occurs only when GWTP is operational); the application of controls for determining when discharge to HB could occur based on HB flowrates and treated water quality (i.e., no discharge occurs when flow in HB is below the discharge criterion specified in the iROD); and HB characteristics (type of bottom, depth characteristics, water clarity, observed aquatic vegetation, canopy cover, streamflow sustainability, presence of pools or impoundments along HB, and listing in the Integrated Report for nutrients or aquatic vegetation), there appears to be no requirements for assigning numerical criteria for nutrient limits in the GWTP effluent to HB.

References

Texas Surface Water Quality Standards. Texas Administrative Code Title 30, Part 1 Chapter 307, Texas Register 1784, April 29, 1988 as amended in Texas Register 6294 on July 22, 2010.

TCEQ Water Quality Division, RG-194, Procedures to Implement the Texas Surface Water Quality Standards, January 2012.

Draft 2012 Texas Integrated Report - Texas 303(d) List.

Current Understanding of Caddo Lake and its Watershed. Data Server for Caddo Lake Information. 2006. http://caddolakedata.us/media/290/hdr.pdf

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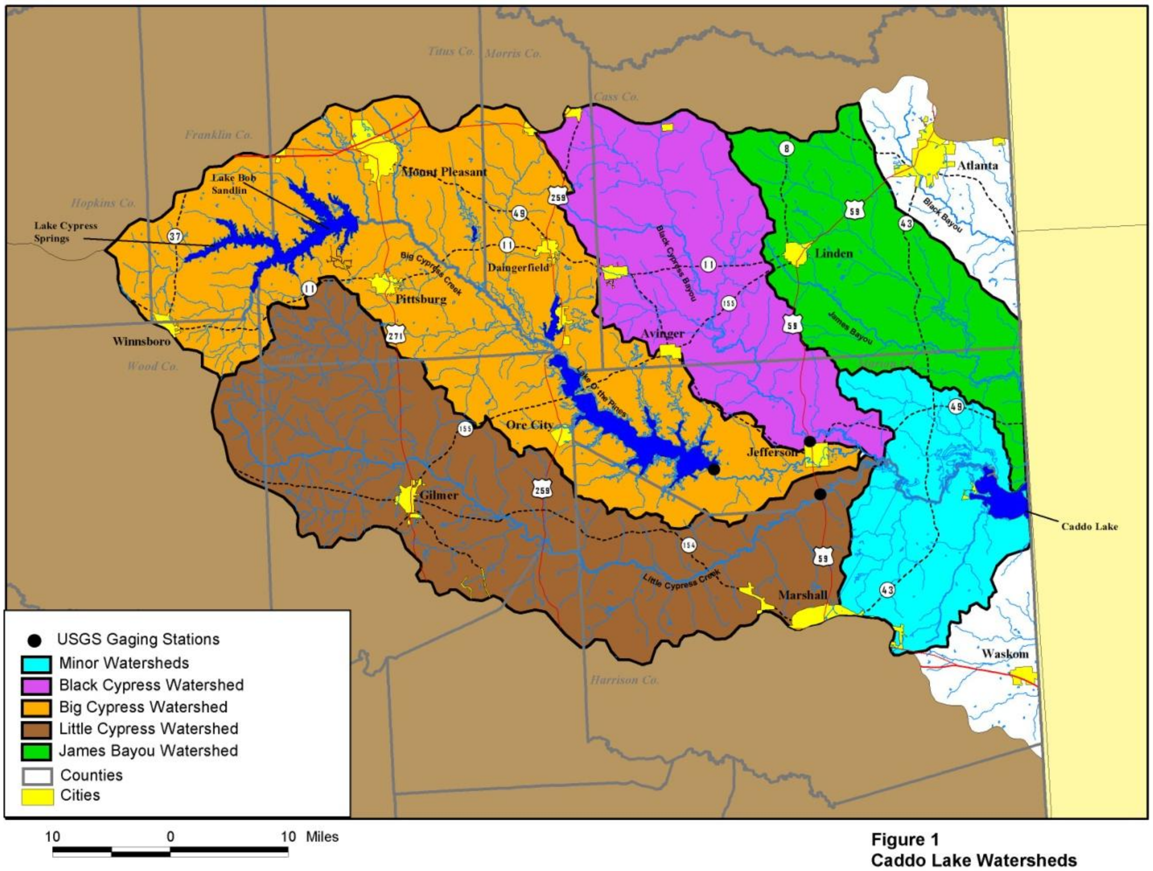

Figure 1
Caddo Lake Watersheds

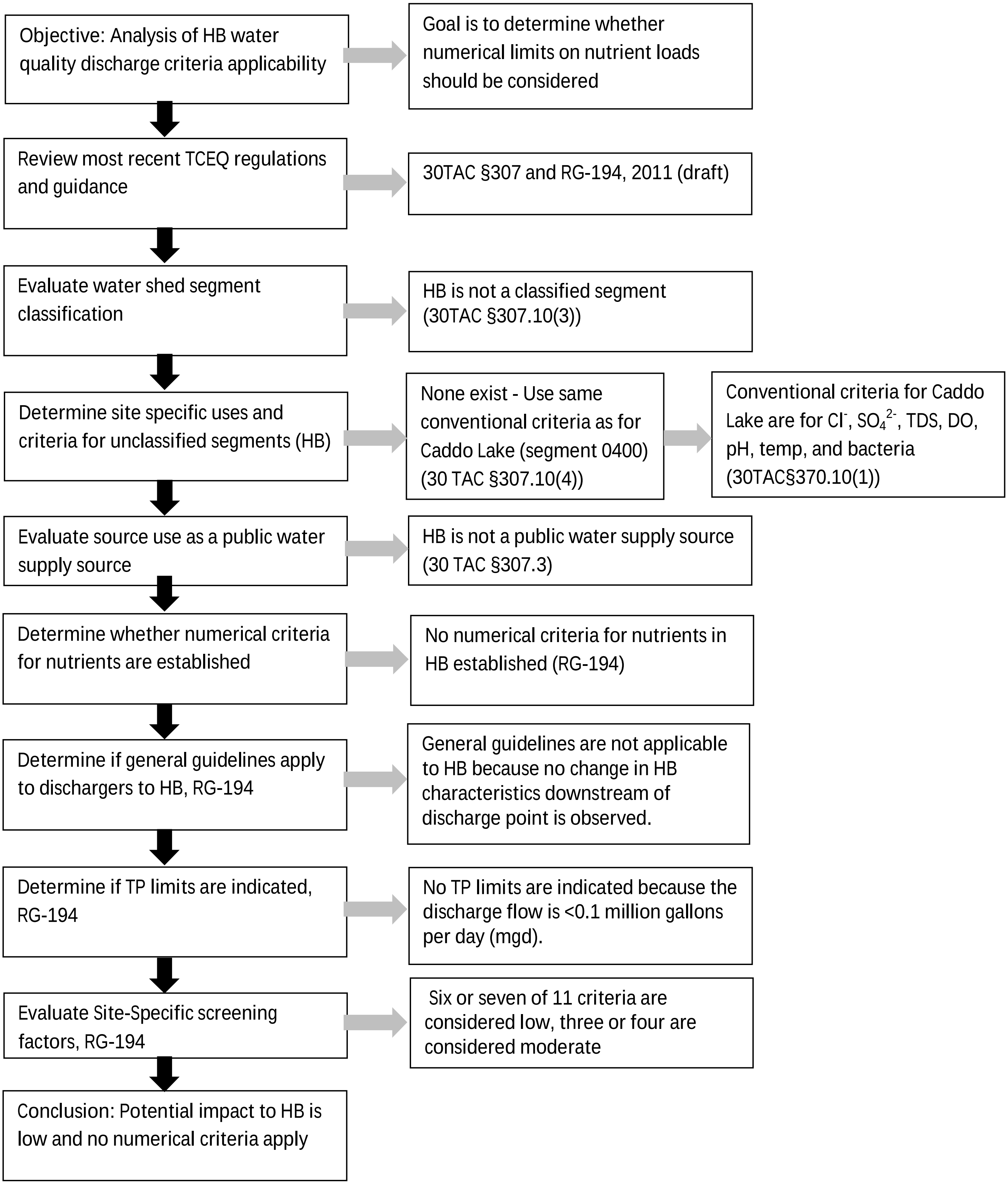

Figure 2 Assessment of Applicability of Texas Surface Water Discharge Criteria on Harrison Bayou

00119205

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

June 28, 2013

DAIM-ODB-LO

Mr. Rich Mayer
US Environmental Protection Agency
Superfund Division (6SF-AT)
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Final Remedial Action Work Plan, LHAAP-50,
Longhorn Army Ammunition Plant, Karnack, Texas, June 2013

Dear Mr. Mayer,

The revised Response to Comments and the above-referenced document are being transmitted to you for your records. In accordance with the FFA, the April 2013 Draft Final was revised during informal dispute resolution between the Parties, EPA Region 6 and Longhorn Army Ammunition Plant.

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:
A. Palmie, TCEQ, Austin, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
J. Lambert, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
M. Plitnik, 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 28, 2013

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 Remedial Action Work Plan, LHAAP-50,
Longhorn Army Ammunition Plant, Karnack, Texas, June 2013

Dear Ms. Palmie,

The revised Response to Comments and the above-referenced document are being transmitted to you for your records. In accordance with the FFA, the April 2013 Draft Final was revised during informal dispute resolution between the Parties, EPA Region 6 and Longhorn Army Ammunition Plant.

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
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
J. Lambert, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
M. Plitnik, USAEC, San Antonio, TX
D. Wacker, AECOM, San Antonio, TX (for project files)

00119207

FINAL
REMEDIAL ACTION WORK PLAN
LHAAP-50, FORMER SUMP WATER TANK
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

ON THE LINE

U.S. Army Corps of Engineers

Prepared By:

AECOM

AECOM Technical Services

June 2013

FINAL
REMEDIAL ACTION WORK PLAN
LHAAP-50, FORMER SUMP WATER TANK
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 2013

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Acronyms and Abbreviations

µg/kg	micrograms per kilogram
µg/L	micrograms per liter
1,1-DCE	1,1-dichloroethylene
1,2-DCA	1,2-dichloroethane
AECOM	AECOM Technical Services, Inc.
ARAR	applicable or relevant and appropriate requirements
AST	above ground storage tank
BERA	Baseline Ecological Risk Assessment
bgs	below ground surface
BHHRA	Baseline Human Health Risk Assessment
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	Cis-1,2-dichloroethylene
cm/s	centimeters per second
COC	Chemical of Concern
CVOC	Chlorinated volatile organic compound
DHC	Dehalococcoides ethenogens
DPT	Direct push technology
ECP	Environmental Condition of Property
FFA	Federal Facility Agreement
ft	feet
ft/ft	Feet per foot
ft/year	Feet per year
IDW	Investigation Derived Waste
IWWP	Installation Wide Work Plan
LHAAP	Longhorn Army Ammunition Plant
LTM	Long-term Monitoring
LUC	Land Use Control
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
MSC	medium specific concentration

NAD	North American Datum
NCP	National Oil and Hazardous Substances Contingency Plan
NPL	National Priorities List
OTR	over the road
PCE	Tetrachloroethylene
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
sf	square feet
SOP	Standard operating procedure
TAC	Texas Administrative Code
TCE	Trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TOC	Total Organic Carbon
USEPA	United States Environmental Protection Agency
VC	Vinyl chloride
VFAs	Volatile Fatty Acids
VOC	Volatile Organic Compounds

1 INTRODUCTION

The LHAAP is an inactive, government-owned, formerly contractor-operated and maintained industrial facility located in central-east Texas in the northeastern corner of Harrison County. The facility occupies approximately 1,400 of its former 8,416 acres located between State Highway 43 in Karnack, Texas, and the western shore of Caddo Lake as shown in **Figure 1-1**. LHAAP was listed as a National Priorities List (NPL) site on August 9, 1990, due to threatened releases of hazardous substances, pollutants, or contaminants. The United States Environmental Protection Agency (USEPA), the Texas Water Commission (now the Texas Commission on Environmental Quality [TCEQ]), and the United States Department of the Army signed a Federal Facilities Agreement (FFA) on December 30, 1991.

Remedial activities are required under the Record of Decision (ROD) issued for the LHAAP-50 site in September 2010 (Shaw, 2010a). This Remedial Action Work Plan (RAWP) describes the planned remedial action (RA) to address risks associated with contaminated soil and groundwater at the LHAAP-50 site. This RAWP has been developed using the basis and details of the Remedial Design (RD) for the LHAAP-50 site which was approved by the regulatory agencies in September 2011 (Shaw, 2011).

1.1 Organization of Work Plan

This work plan is composed of the following sections:

- Section 1: “Introduction” summarizes the site background, proposed remedy including the chemicals of concern (COCs) and their respective cleanup levels, the nature and extent of contamination, and remedial action objectives (RAOs).
- Section 2: “Land Use Control Plan” describes the proposed scope of work including the implementation activities associated with the Land Use Control (LUC) component of the remedy.
- Section 3: “Soil Excavation and Disposal” describes the excavation, removal, and site restoration activities.
- Section 4: “Monitored Natural Attenuation” describes the delineation activities, groundwater and surface water sampling, health and safety procedures and quality assurance/quality control (QA/QC) procedures associated with the monitored natural attenuation (MNA) component of the remedy.
- Section 5: “Remedy Performance Evaluation and Reporting” describes the MNA performance evaluation reporting, annual long-term monitoring (LTM) reporting, and five-year reviews to be performed for the remedy.
- Section 6: “Schedule” describes the proposed implementation schedule for the RA activities.
- Section 7: “References” provides a list of references cited in the document.

The work plan also includes Appendix A supporting the main text.

- Appendix A: Sample Annual Land Use Control Compliance Certification Documentation

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. As of the date of this report, work is being conducted under the existing IWWP (Shaw, 2010b). A revised IWWP is currently in progress; the forthcoming IWWP will supersede the existing IWWP following regulatory approval.

1.2 LHAAP-50 Background

The LHAAP-50 site (former sump water tank) is in the north-central portion of LHAAP and covers an area of approximately 1 acre (**Figure 1-2**). The northeastern half of the LHAAP-50 is an open area of grass and brush that is bounded by South Crocket Avenue to the northeast, a drainage ditch to the west, a railroad spur to the south, and Goose Prairie Creek to the north. Runoff from the northeastern half of the site is generally toward the northeast. Runoff is collected by a drainage ditch to the northeast that runs parallel to South Crockett Avenue and eventually joins Goose Prairie Creek. Runoff from the southwestern portion of the site is collected to the west by a drainage ditch that carries the runoff north into Goose Prairie Creek. Goose Prairie Creek eventually empties into Caddo Lake, a source of drinking water for several neighboring communities in Louisiana.

LHAAP-50 contained a 47,000-gallon capacity aboveground storage tank (AST) which received industrial wastewater from various industrial waste production sumps throughout LHAAP from 1955 to 1988. After the solids were filtered, the storage tank contents were discharged up stream of the bridge on Crockett Avenue, south of 51st Street into Goose Prairie Creek. The flow in the creek was sufficient to dilute the water to safe levels (Jacobs, 2002). If natural flow in the creek was considered insufficient, clean water was apparently pumped into the creek to dilute the contents. The AST has been removed.

Between 1992 and 2010, numerous investigations were conducted in a phased approach to determine the nature and extent of contamination at LHAAP-50. Beginning in 1995, an initial site investigation was conducted at LHAAP-50 where sediments and soils were sampled to assess whether industrial wastewater that had been stored in the AST had impacted the site. Phase II and III investigations were conducted that included the collection of soil, sediment, surface water, and groundwater samples (Jacobs, 2002). Additional investigations were conducted, including the installation of several wells and soil borings from 2000 through 2002, a site assessment in 2003, and further sampling from 2004 through 2010, to determine the nature and extent of contamination at LHAAP-50 (Shaw, 2011). Media investigated included soil, sediment, surface water, and groundwater. The Final Baseline Ecological Risk Assessment (BERA) was based on investigations conducted from 1993 through 2006. The Final Baseline Human Health Risk Assessment (BHHRA) used data from the investigations conducted through 2001 (Shaw, 2009). The additional data collected between 2006 and 2008, following completion of the BHHRA, was evaluated in the Feasibility Study to determine if the outcome of the risk assessment would change (Shaw, 2009). The additional data collected did not change the outcome of the risk assessment.

The RA to be implemented at the LHAAP-50 site was developed and selected in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP) (40

Code of Federal Regulations 300). The selected remedy, finalized in the ROD, was developed based on the industrial land use scenario, which is consistent with the anticipated future use as a national wildlife refuge. A land use notification will be recorded at the Harrison County Courthouse to indicate that the site is suitable for non-residential use.

1.2.1 Proposed Remedy

As discussed in the ROD, the COCs at the LHAAP-50 site include dissolved phase perchlorate and volatile organic compounds (VOCs) including tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), 1,2-dichloroethane (1,2-DCA), cis-1,2-dichloroethylene (cis-1,2-DCE), and vinyl chloride (VC) in groundwater, and perchlorate in soil. There are no COCs in other environmental media at the LHAAP-50 site.

Except for perchlorate, the Safe Drinking Water Act (SDWA), maximum contaminant levels (MCLs) will be used as cleanup levels for VOCs in groundwater. For perchlorate in groundwater, since no MCL exists, the groundwater medium-specific concentration (MSC) for industrial use (GW-Ind) is used as the cleanup level (Shaw, 2009). MSCs are provided under Texas Risk Reduction Rules [30 Texas Administration Code (TAC) 335.551 through 335.569]. For perchlorate in soil, the soil MSC for industrial use based on protection of groundwater (GWP-Ind) value is used as the cleanup level (Shaw, 2009). For perchlorate in surface water, the groundwater MSC for residential use (GW-Res) is used as the cleanup level (Shaw, 2009).

Table 1-1 below presents the cleanup levels for the LHAAP-50 site.

Table 1-1: Cleanup Levels

Chemical of Concern (COC)	Concentration	Basis
Soil (µg/kg)		
Perchlorate	7,200	GWP-Ind
Groundwater (µg/L)		
Tetrachloroethylene	5	MCL
Trichloroethylene	5	MCL
1,1-Dichloroethylene	7	MCL
1,2-Dichloroethane	5	MCL
Cis-1,2-dichloroethylene	70	MCL
Vinyl chloride	2	MCL
Perchlorate	72	GW-Ind
Surface Water (µg/L)		
Perchlorate	26	GW-Res

Notes and Abbreviations:
µg/kg – micrograms per kilogram
µg/L – micrograms per liter
GW-Ind – Groundwater MSC for industrial use for perchlorate
GW-Res – Groundwater MSC for residential use for perchlorate
GWP-Ind – Soil MSC for industrial use based on groundwater protection
MCL – maximum contaminant level

The remedy for LHAAP-50 site will include the following components:

- Soil Removal: Excavation and off-site disposal of perchlorate-contaminated soil.
- Land Use Control: LUC in the impacted area will ensure protection of human health by restricting the use of groundwater to environmental monitoring and testing only. The LUC will remain in effect until such time as the U.S. Army, TCEQ and USEPA agree that the concentrations of COCs have met the cleanup levels.
- Monitored Natural Attenuation: A program of MNA will be implemented to establish confidence in attenuation trends and verify that the perchlorate and VOC plumes are stable or shrinking and will not migrate to nearby surface water at levels that may present an unacceptable risk to human health or the environment. Natural attenuation is expected to reduce contaminant concentrations to their respective clean-up levels, and return groundwater to its beneficial use, wherever practicable.

  Performance objectives for the MNA program will be re-evaluated after two years of groundwater monitoring. During those two years, groundwater monitoring will be performed on a quarterly basis. If MNA is found to be ineffective, a contingency remedy to enhance MNA will be implemented.
- Long-term Monitoring/Five-year Reviews: If MNA is found to be effective (at the end of the two year period), it will be continued, and long-term monitoring (LTM) will begin at a semiannual frequency for the following three years. In subsequent years, LTM will be performed annually until the following CERCLA five-year review. The LTM associated with this remedy will be used to track the continued effectiveness of MNA and will continue at least once every five years until the cleanup levels are achieved. Based on the calculated attenuation rates for the LHAAP-50 site, groundwater cleanup levels are expected to be met through natural attenuation in approximately 50 years (Shaw, 2009). This time-frame will be re-evaluated as part of the MNA evaluation and periodic reviews.

1.2.2 Nature and Extent of Contamination

An area of perchlorate contaminated soil was identified within the perchlorate groundwater plume footprint, near the location of the former AST. The contaminated soil area is approximately 4,000 square feet (sf) and 1 foot in depth, for a volume of approximately 150 cubic yards. The contaminated soil area is shown on **Figure 1-3**.

Figures 1-4 and **1-5** present the current estimated VOC and perchlorate plumes, respectively, in the shallow zone groundwater. The shallow zone plumes start upgradient of monitoring well 50WW02 and extend towards monitoring well 50WW07. The size of the VOC plume is estimated to be approximately 5.5 million gallons. Results from additional direct push technology (DPT) sampling, discussed in Section 4.2.4, will be used to refine the extent of the perchlorate plume in the shallow zone groundwater.

Currently, only well 50WW06 is located within the intermediate zone plume boundary (**Figure 1-6**) of the LHAAP 50 Site. The perchlorate plumes from LHAAP-47 and LHAAP-50 are currently assumed to be comingled. Results from DPT sampling and additional well installation, discussed in Section 4.2.5, will be used to refine the extent of the perchlorate plume in the intermediate zone groundwater.

1.2.3 Site Hydrogeology

Groundwater at the site is generally approximately 20 feet below ground surface (bgs) in the shallow groundwater zone and approximately 55 feet bgs in the intermediate zone. Groundwater elevation contours for shallow and intermediate zones, from data collected in August 2010, are included in **Figures 1-4** and **Figure 1-5**, respectively.

Hydraulic conductivities in the shallow zone wells varied from 5.5×10^{-5} to 1.9×10^{-4} centimeters per second (cm/s) (Jacobs, 2002) and groundwater flow in the shallow and intermediate zones is generally to the east. Using an estimated hydraulic gradient of 0.004 feet per foot (ft/ft) from **Figure 1-4** and the listed hydraulic conductivities, the calculated groundwater flow velocity in the shallow zone ranges from 0.99 feet per year (ft/year) to 3.44 ft/year.

1.2.4 Remedial Action Objectives

The RA at LHAAP-50 will protect human health and meet applicable or relevant and appropriate requirements (ARARs). There are no ecological risks at the LHAAP-50 site (Shaw, 2011).

The RAOs for the LHAAP-50 site, consistent with the reasonably anticipated future use as a national wildlife refuge, are:

- Protection of human health by preventing human exposure to the contaminated groundwater;
- Protection of human health by preventing further potential degradation of groundwater and surface water from contaminated soil;
- Protection of human health and the environment by preventing contaminated groundwater from migrating into nearby surface water; and,
- Return of groundwater to its potential beneficial uses as drinking water, wherever practicable.

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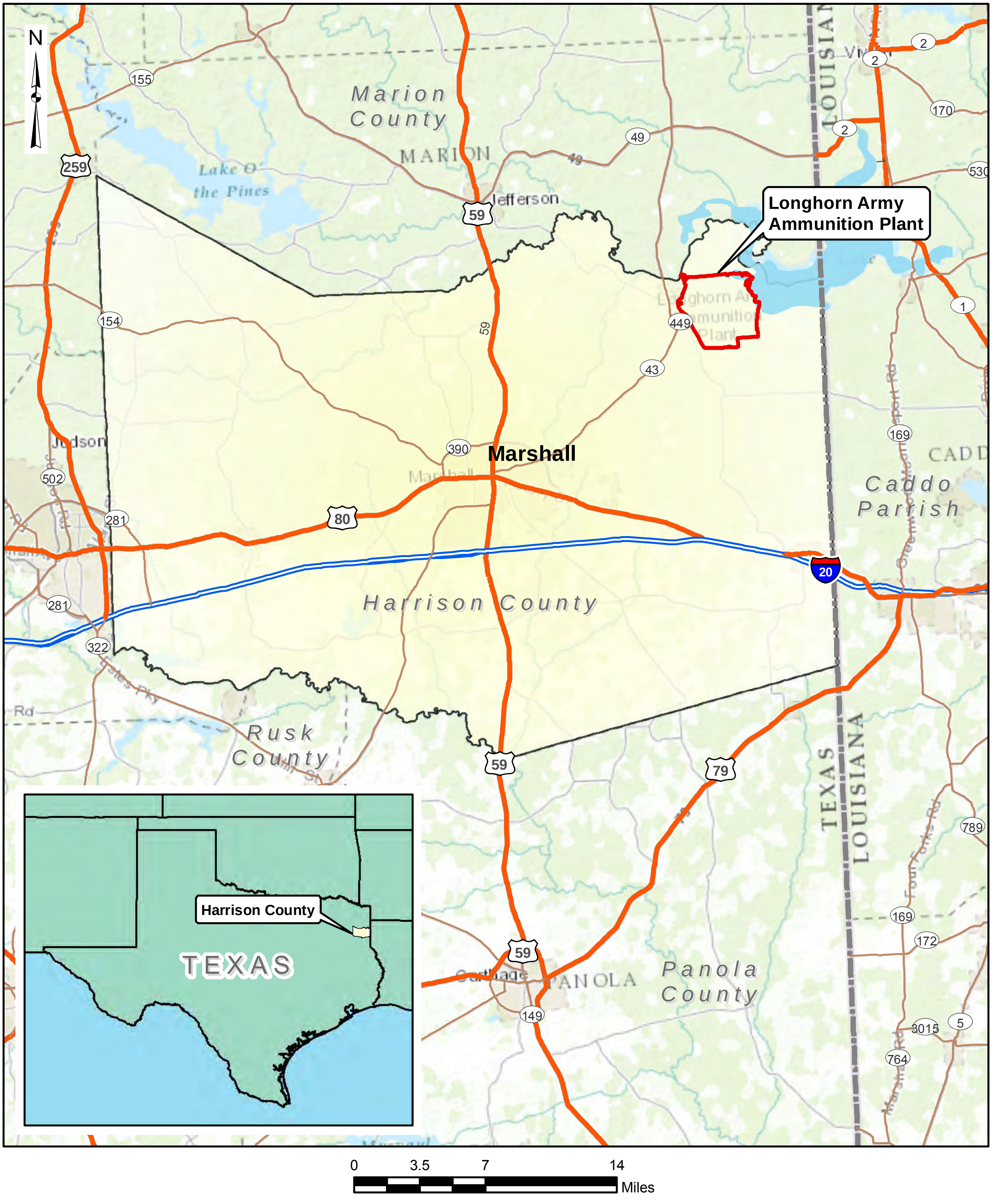

AECOM

Figure 1-1
LHAAP Location Map
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

January 2013

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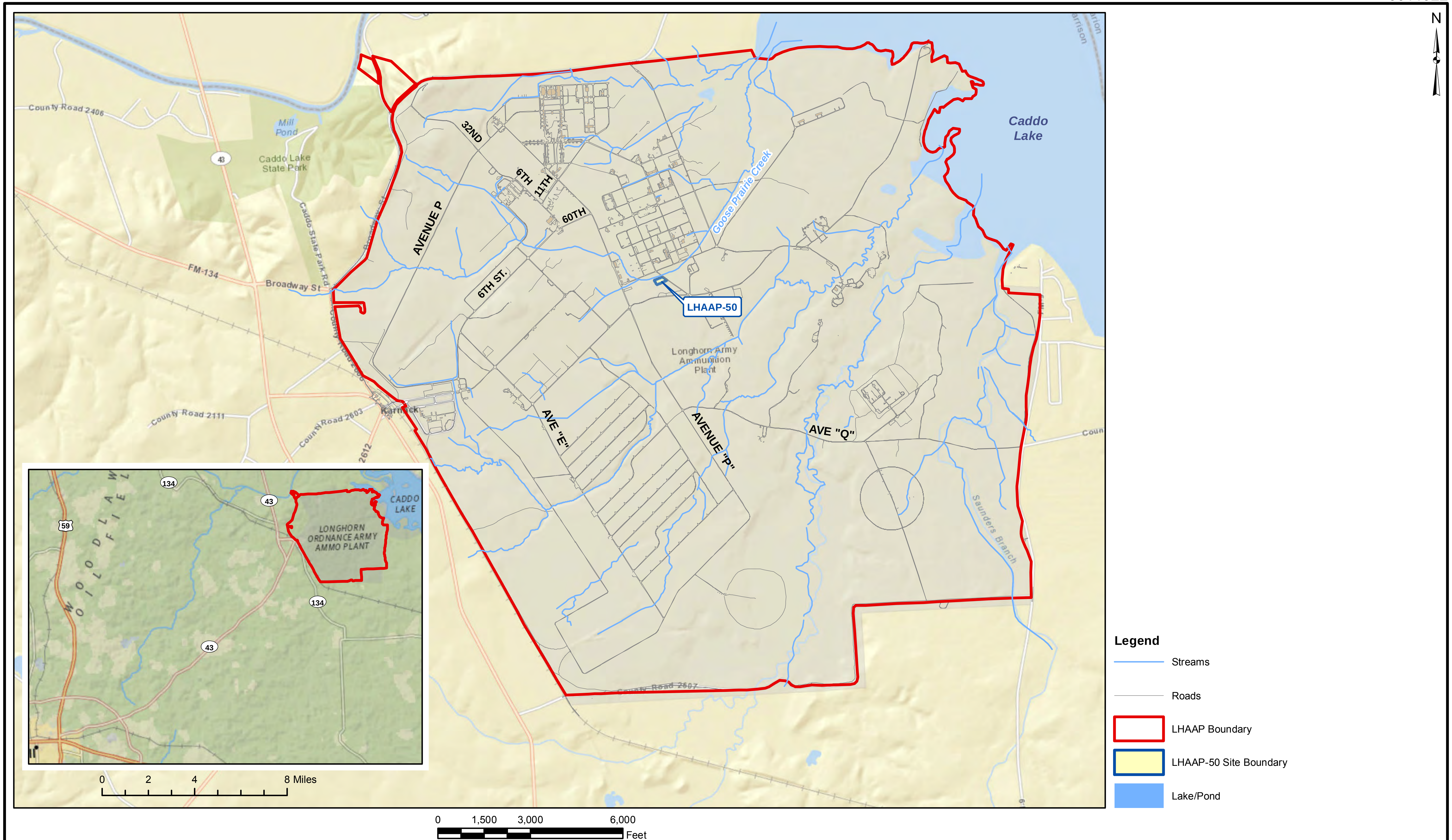
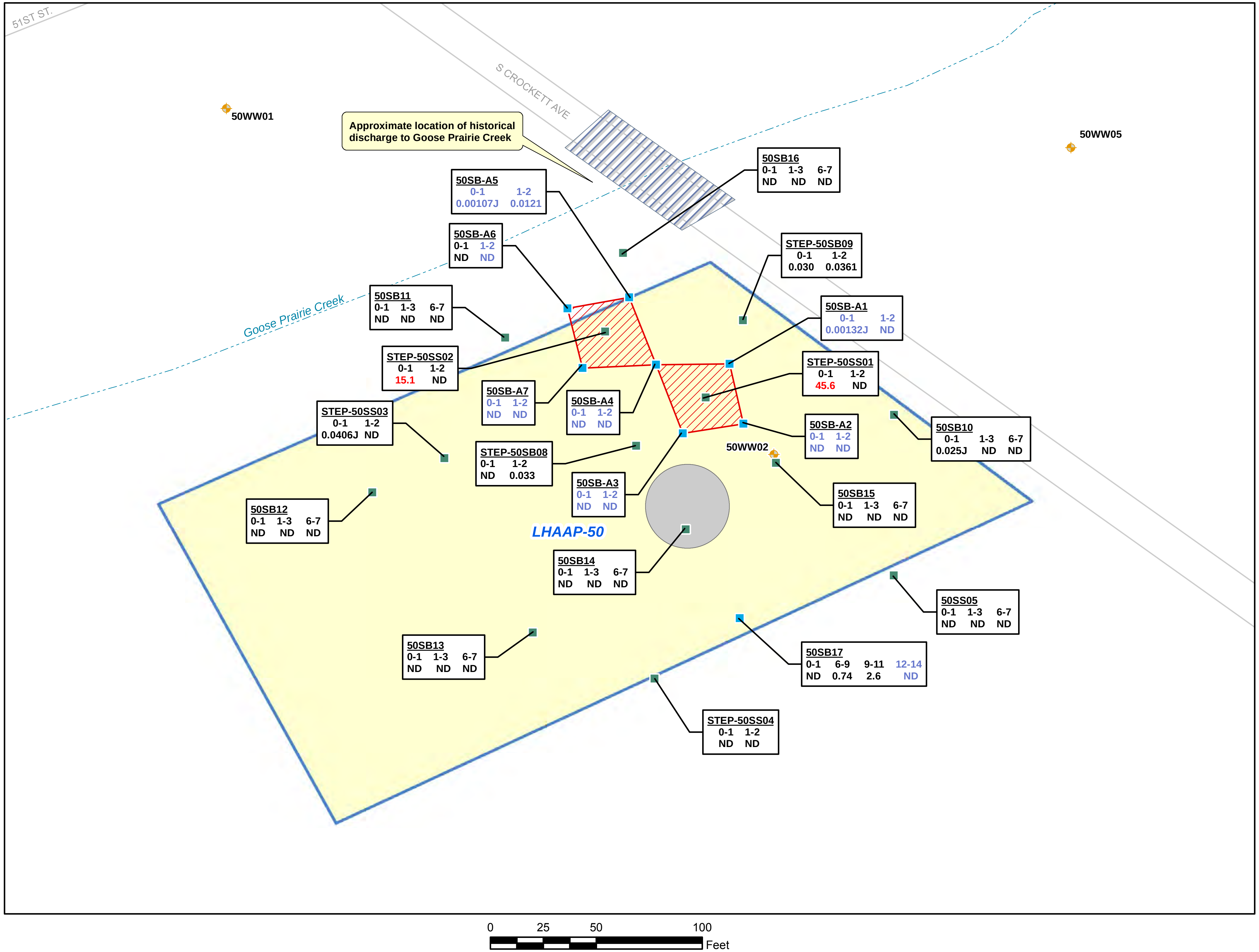


AECOM

Figure 1-2
Site Vicinity Map
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

January 2013



Legend

- Shallow Montoring Well Location
- Existing Soil Sample Location
- Soil Sample Location - August 2012
- Roads
- Goose Prairie Creek
- Bridges
- Former Storage Tank Location
- Proposed Excavation Area
- LHAAP-50 Site Boundary

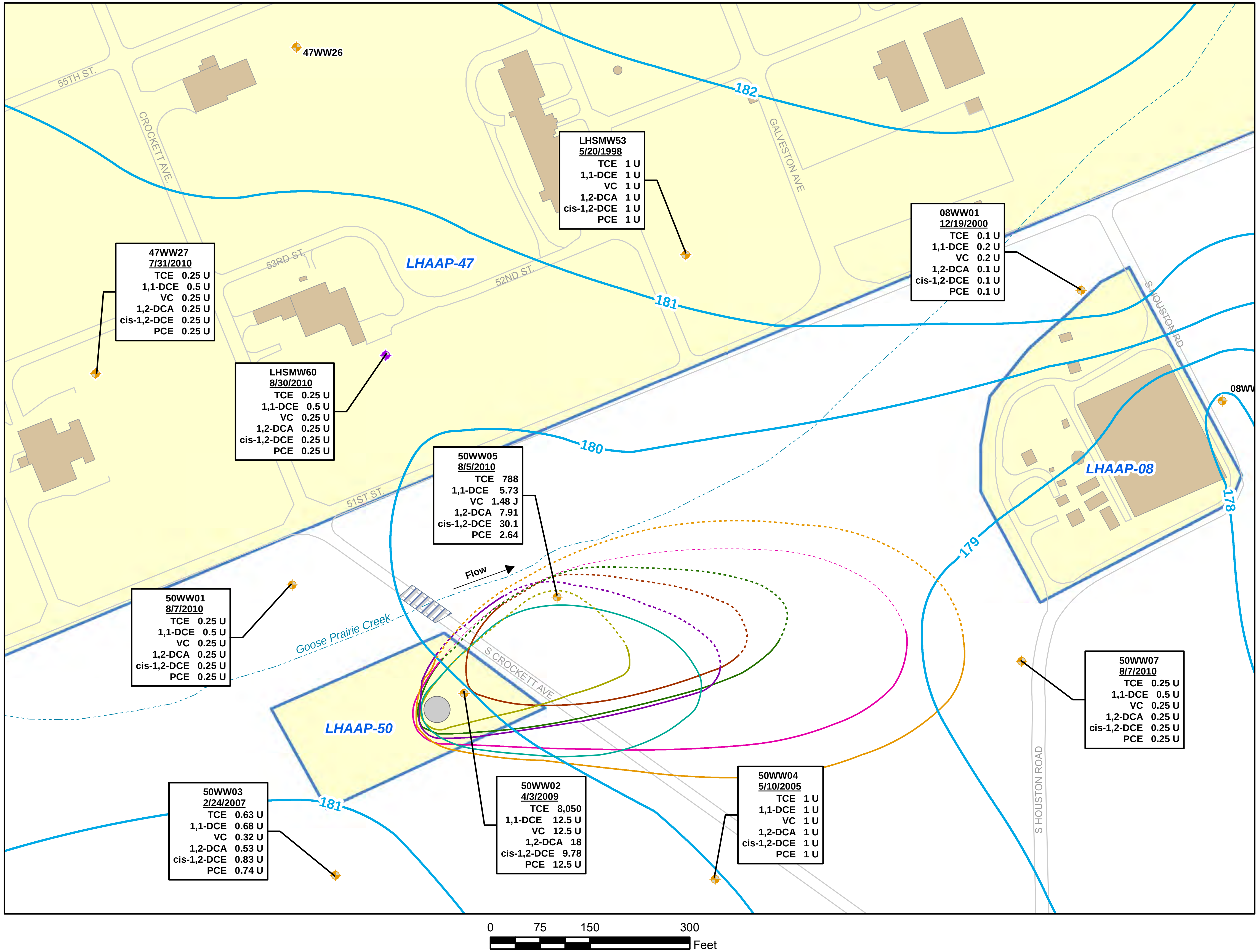
Notes:
1. Perchlorate concentrations are reported in milligrams per kilogram(mg/kg).
2. Soil sample locations where perchlorate was not analyzed are not shown on the figure.
3. Results from August 2010 are shown in blue.
4. Results prior to August 2010 were obtained from investigations in 2003 by "Solutions to Environmental Problems Inc." and in 2007 by SHAW Environmental Inc.
5. Red - Perchlorate concentration above GWP - Ind (7.2 mg/kg).
6. Initial excavation depth is anticipated to be one foot.

AECOM

Figure 1-3
Site Perchlorate in Soil - August 2012
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013



Legend

- Shallow Monitoring Well
- Shallow/Intermediate Monitoring Well
- 1,1-DCE Plume (7 µg/L Extent)
- 1,2-DCA Plume (5 µg/L Extent)
- PCE Plume (5 µg/L Extent)
- TCE Plume (5 µg/L Extent)
- VC Plume (2 µg/L Extent)
- cis-1,2-DCE Plume (70 µg/L Extent)
- Groundwater Elevation Contour
- Roads
- Goose Prairie Creek
- Bridges
- Buildings
- Former Storage Tank Location
- LHAAP-50 Site Boundary

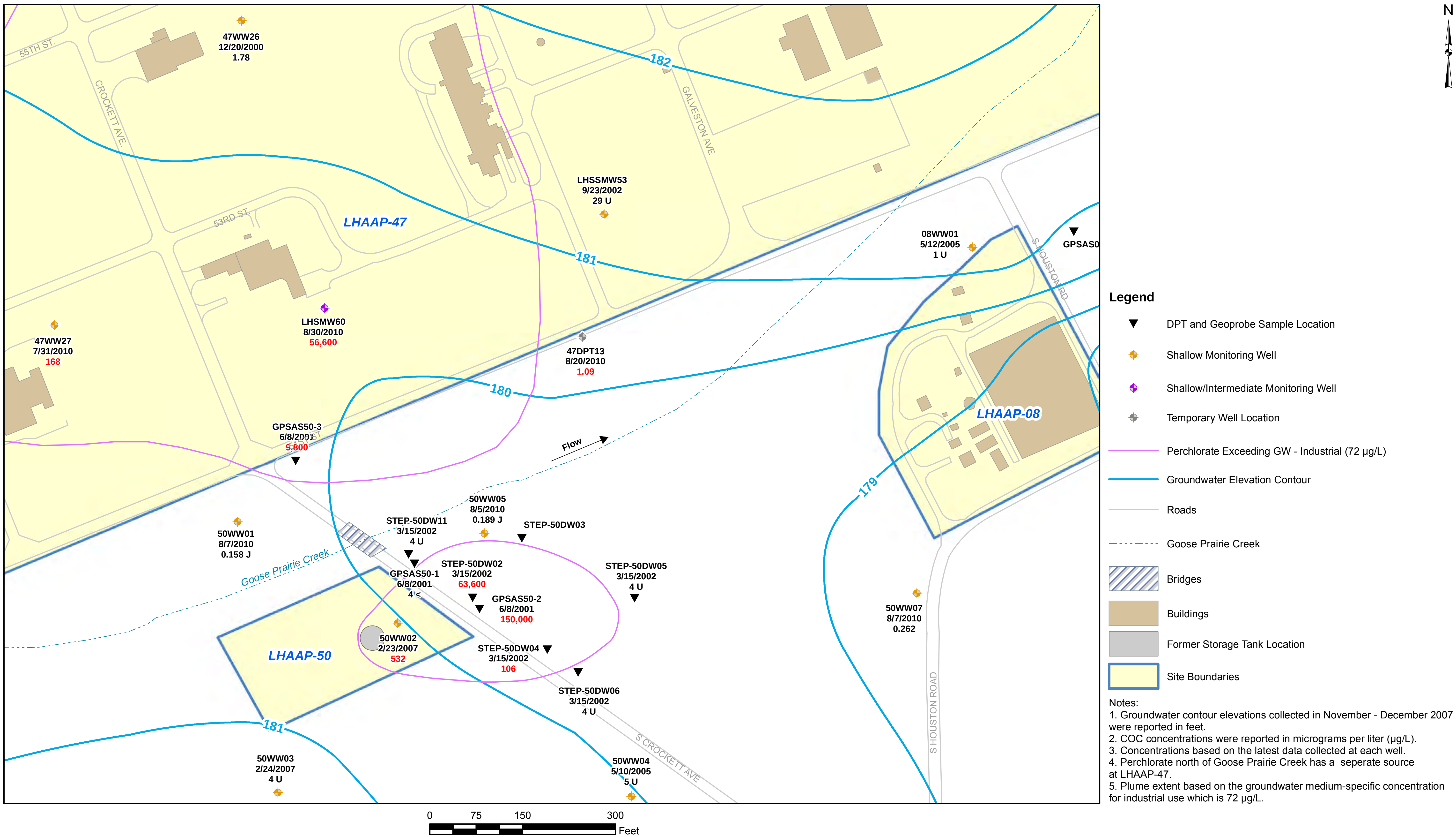
Notes:
1. Groundwater contour elevations collected in November - December 2007 were reported in feet.
2. COC concentrations were reported in micrograms per liter (µg/L).
3. Concentrations based on the latest data collected at each well.
4. TCE - Trichloroethene
DCE - Dichloroethene
VC - Vinyl chloride
PCE - Tetrachloroethene
DCA - Dichloroethane
5. Wells 50WW02, 50WW03, 50WW04, and LHSMW53 were dry in August 2010. The most recent available data has been used for these wells.
6. Plume extent based on maximum contaminant limit.

AECOM

Figure 1-4
Extent of VOCs in Shallow Zone Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013



Legend

- DPT and Geoprobe Sample Location
- Shallow Monitoring Well
- Shallow/Intermediate Monitoring Well
- Temporary Well Location
- Perchlorate Exceeding GW - Industrial (72 µg/L)
- Groundwater Elevation Contour
- Roads
- Goose Prairie Creek
- Bridges
- Buildings
- Former Storage Tank Location
- Site Boundaries

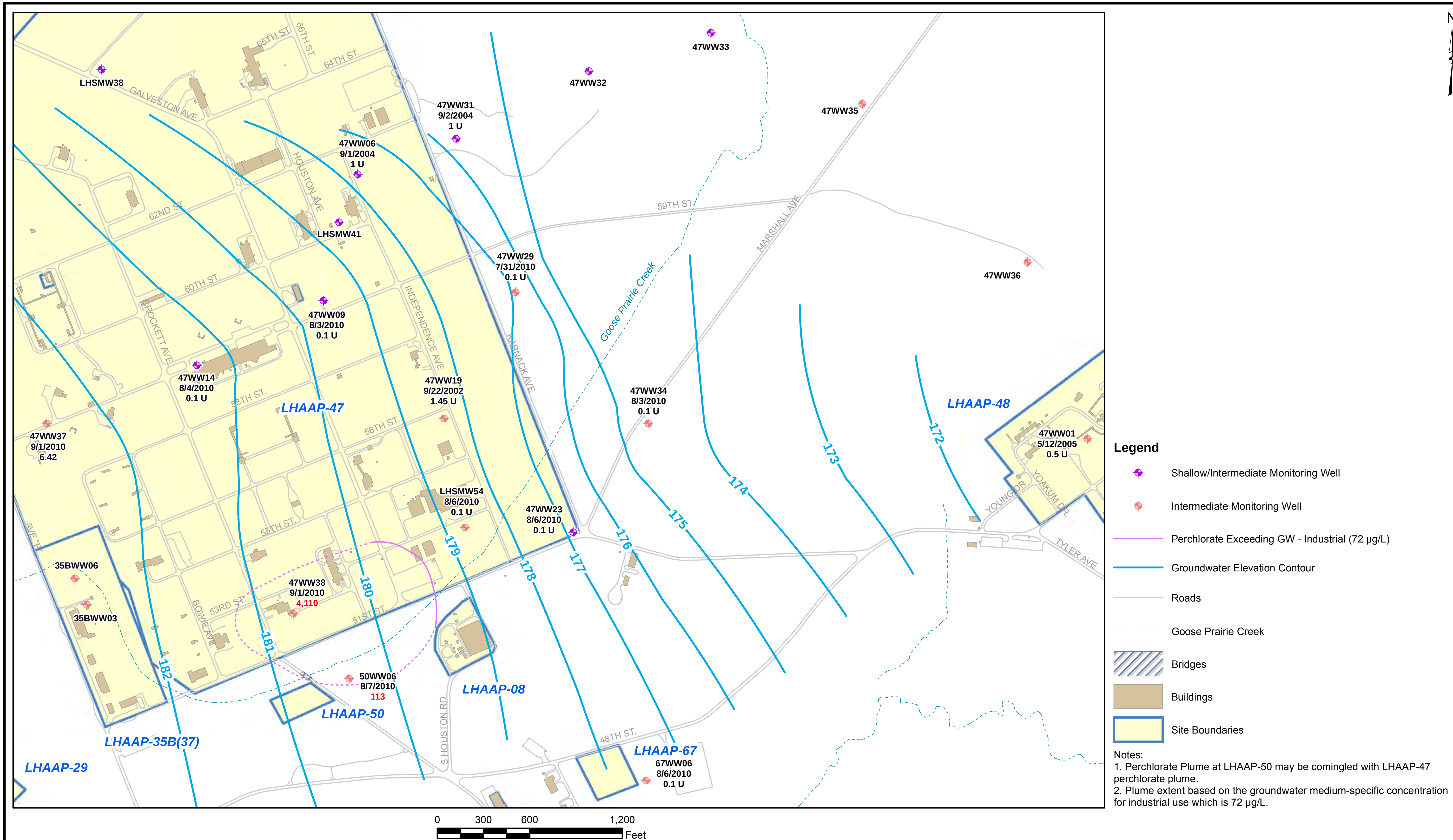
Notes:
1. Groundwater contour elevations collected in November - December 2007 were reported in feet.
2. COC concentrations were reported in micrograms per liter (µg/L).
3. Concentrations based on the latest data collected at each well.
4. Perchlorate north of Goose Prairie Creek has a seperate source at LHAAP-47.
5. Plume extent based on the groundwater medium-specific concentration for industrial use which is 72 µg/L.

AECOM

Figure 1-5
Extent of Perchlorate in Shallow Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013



AECOM

Figure 1-6
Extent of Perchlorate in Intermediate Zone Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013

2 LAND USE CONTROL PLAN

The U.S. Army or its representatives will be responsible for LUC implementation and certification, reporting and enforcement. The U.S. Army will address LUC problems within its control that are likely to impact remedy integrity and will address problems as soon as practicable. The following sections provide details for the LUC component of the RA.

2.1 Land Use Control Implementation

The objectives of LUC at LHAAP-50 are to prevent human exposure to groundwater contamination presenting an unacceptable risk to human health and ensure that there is no withdrawal or use of groundwater beneath the site for anything other than environmental monitoring and testing until the cleanup levels are attained. A restriction against residential use of groundwater will remain in effect until the levels of the COCs in groundwater allow unrestricted use and unlimited exposure (UUUE). Notification of the groundwater use restriction will accompany all transfer documents and will be recorded at the Harrison County Courthouse in accordance with the Texas Administrative Code (TAC) Title 30, §335.566.

The LUC address the area of the LHAAP-50 site that contain shallow and intermediate zone groundwater VOC and perchlorate plumes. If contamination is found in the deep zone during the groundwater investigation (Section 4.1), the LUCs will also address the deeper aquifer. The U.S. Army is responsible for implementing, maintaining, monitoring, reporting on, and enforcing the LUC.

The U.S. Army will undertake the following actions to implement the groundwater restriction LUC for LHAAP-50 site:

- **Define the Area of the Groundwater Use Restriction**

  The first round of groundwater sampling data will be used in conjunction with the historic data to define the groundwater use restriction boundary. A buffer will be provided to address uncertainty.

- **Survey the LUC Boundary**

  Proposed boundary will be coordinated with the USEPA and TCEQ, and the LUC boundary will be surveyed by a State-licensed surveyor. A legal description of the surveyed area will be appended to the survey plat.

- **Record the LUC in Harrison County**

  The LUC plat, legal description and groundwater use restriction language will be recorded in the Harrison County Courthouse in accordance with the TAC Title 30, §335.566.

- **Notify the Texas Department of Licensing and Regulation of the LUC**

  The Texas Department of Licensing and Regulation will be notified of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the USEPA and the TCEQ. The survey plat, legal boundary, and description of the groundwater restriction, in conjunction with a locator map, will be provided in hard and electronic copy.

The U.S. Army and regulators will consult to determine appropriate actions should there be a failure of a LUC objective at the site after it has been transferred.

2.2 Site Certification and Reporting

The annual inspections/certifications will be completed in compliance with the LUC objectives. The U.S. Army, or the transferee after transfer, will retain the annual LUC inspection/certification documents (**Appendix A** of this document) in the project files for incorporation into the CERCLA five-year review reports, and these reports will be made available to the USEPA and TCEQ upon request. If any violations are found during the annual certification, a separate written explanation will be provided to the USEPA and TCEQ indicating the specific violations found and what efforts or measures have or will be taken to correct the violations. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental transfer document. The need to continue annual certifications will be revisited during CERCLA five-year reviews.

2.3 Notice of Planned Property Conveyances

The U.S. Army will provide notice to the USEPA and TCEQ when conveying the LHAAP-50 site acreage. The notice will describe the mechanism by which the LUC will continue to be implemented, maintained, inspected, reported, and enforced. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the ECP or other environmental document for transfer. The U.S. Army retains the responsibility for remedy integrity and is responsible for addressing substantive violations of the LUC performance objective that would undermine the U.S. Army CERCLA remedy. The U.S. Army will be responsible for outlining the transferee's LUC obligations into property transfer documents.

2.4 Opportunity to Review Text of Intended Land Use Control

The U.S. Army will provide copies of the groundwater use restriction notification to the TCEQ and USEPA prior to its recordation in Harrison County. The U.S. Army will produce an ECP or other environmental document prior to transfer of the LHAAP-50 site and provide a draft to the USEPA and TCEQ.

2.5 Notification Should Action(s) which Interfere with Land Use Control Effectiveness be Discovered Subsequent to Conveyance

Should the U.S. Army discover any activity on the property inconsistent with the LUC performance objective after conveyance of the site, USEPA and TCEQ will be notified within 72 hours. The U.S. Army, in conjunction with the USEPA, TCEQ, and the transferee, would correct the problem(s) discovered. This reporting requirement does not preclude the U.S. Army from taking immediate action pursuant to its CERCLA authority to prevent any perceived risks to the human health and the environment.

2.6 Land Use Control Enforcement

Should the LUC remedy fail, the U.S. Army will coordinate with the USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. The U.S. Army may notify the local agencies with jurisdiction of any LUC violation(s) by future property owners and will work cooperatively with them to restore owner/user compliance with the LUC. Should circumstances warrant, the U.S. Army can choose to exercise its response authorities under CERCLA.

2.7 Modification or Termination of Land Use Controls

Any significant modification to, or termination of the LUC or a land use change inconsistent with the LUC objective will be made only with USEPA and TCEQ concurrence, which will be sought prior to commencing actions that may impact remedy integrity.

The LUC will remain in effect until such time as the U.S. Army, TCEQ, and USEPA agree that the concentrations of COCs have met cleanup levels. When this occurs, the LUC will be terminated consistent with the NCP process for post-ROD changes. If the property has been transferred and a determination by the U.S. Army, TCEQ and USEPA has been made to terminate the LUC, the U.S. Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.

2.8 Comprehensive Land Use Control Management Plan

Upon finalization of this LUC RA, the amended LUC boundary map and legal description recordation will be inserted into the Comprehensive LUC Management Plan for LHAAP.. The Comprehensive LUC Management Plan figure and table will be updated to reflect the inclusion of LHAAP-50.

The Comprehensive LUC Management Plan consists of LHAAP RD documents and a survey plat showing the locations where the LUC being implemented at LHAAP is applied. The purpose of this Comprehensive LUC Management Plan is to ensure all site-specific LUC are compiled into one comprehensive document for both pre-transfer use by the installation and for post-transfer use by the transferee. This document has been provided to USEPA and TCEQ and is also accessible to the public. The Comprehensive LUC Management Plan is located in the Marshall Public Library to accompany LHAAP's Administrative Record.

3 SOIL EXCAVATION AND DISPOSAL

This section discusses the objectives and details of the soil excavation, disposal, and site restoration under the RA. Perchlorate has been detected in surficial soils at the LHAAP-50 site. The nature and extent of soil contamination is discussed in section 1.2.2.

3.1 RA Implementation

This section describes the field and other activities planned at the LHAAP-50 site that relate to the RA component of the soil remedy. General activities that would apply to any site with similar characteristics are presented below. Site-specific activities are described in associated subsections.

3.1.1 Pre-mobilization Activities

A pre-construction meeting will be held prior to initiation of field activities.

A survey to determine the boundaries of the excavation will be performed by a state-licensed surveyor and the coordinate system will be Texas State Plane, NAD 1983.

3.1.2 Preliminary Activities/Mobilization

A field schedule will be finalized with the selected excavation contractor prior to mobilizing to the LHAAP-50 site. An on-site project kickoff meeting will be held with the contractor to review the scope of work including the excavation limits, utility clearances, and health and safety issues.

3.1.3 Site/Utility Clearance

Existing utility maps will be utilized to locate subsurface utilities. All proposed excavation areas will be marked, Underground Service Alert (One Call) will be notified at least two working days prior to intrusive work, and the utility clearance SOP will be followed.

3.2 Excavation Activities

The proposed excavation area is shown on **Figure 1-3**. The total volume of contaminated soils to be excavated at LHAAP-50 is estimated to be 150 cubic yards, which includes a 1-foot deep excavation within an area of 4,000 square feet. Soil samples collected in August 2010 have been used to define the boundaries of the excavation (Shaw, 2011).

Prior to the start of excavation, the site will be surveyed and the excavation extents will be marked. Vegetation clearing will be completed including removal of any trees and/or shrubs located within the marked excavation area. To protect Goose Prairie Creek, silt fencing will be installed in the area between the excavation and the edge of the creek. Based on known field conditions, it may be necessary to install a bed of gravel to increase the stability of the surficial soils between the excavation area and S. Crockett Avenue. This will facilitate truck traffic for removal and disposal of excavated soils, and will reduce tracking of mud onto S. Crockett Avenue. The proposed haul route through LHAAP is presented as **Figure 3-1**.

3.2.1 Site Access Control

Temporary fencing (i.e. 6 feet high chain link fence or equivalent) with lockable access gates will be erected around the work site to discourage trespassers. The gates will be closed and locked during non-working hours to prevent pedestrian and vehicle access to the site. Temporary signs will be placed on the fence to warn against trespass. The temporary fence will be removed upon completion of all excavation activities.

3.2.2 Traffic Management

Excavation equipment, up to 20-ton haul trucks, and project related personnel vehicles will be used during the course of the removal action. All excavation activities will be coordinated with the Fish and Wildlife Service personnel at LHAAP. Every effort will be made to ensure safety and minimize disruption of installation traffic at the construction site entrance and along the haul routes.

A CAT 480 track hoe excavator (or equivalent) will be used to excavate the contaminated soils direct load into over-the-road (OTR) trucks that will be used to transport the soil. Truck tires will be cleaned as necessary using dry methods to avoid tracking of substantial dirt or mud onto roadways. Each OTR truck will be equipped with a tarpaulin cover that will be engaged once the vehicle leaves the excavation site. All OTR transport truck drivers will receive site-specific training to assure speed, signaling, and common courtesy at all times.

3.2.3 Soil Confirmation Samples

A 5-point composite soil sample will be collected from approximately every 750 square feet of the excavation floor area and from each side wall. Each sample will be analyzed for perchlorate following EPA Method 6850. Additional excavation wall samples will not be collected unless the depth of excavation is extended beyond 1 foot deep. Confirmation samples will be collected from the floor and sidewalls after excavation is complete. Based on the current excavation area, a total of six composite soil samples will be collected from the floor of the excavation area and eight sidewall samples will initially be collected for confirmation. If the confirmation results exceed cleanup levels, additional excavation and confirmation sampling may be implemented. Sample collection and sample management will be performed in accordance with the Installation-Wide Work Plan.

Following completion of soil excavation, and documentation of clean confirmation samples, the area will be backfilled with clean soil to match surrounding grade. Backfill material will be provided from a commercial off-site source.

3.2.4 Investigation Derived Wastes

Investigation-Derived Waste (IDW) generated during the excavation activities will include excavated soil, disposable sampling equipment, equipment decontamination fluids, and personal protection equipment (PPE). Excavated soil will be removed from the site and hauled in trucks to a Resource Conservation and Recovery Act (RCRA) Subtitle D-permitted landfill. Samples of the excavated material will be collected and analyzed per the requirements of the receiving disposal facility. Liquid IDW (except PPE and disposable sampling equipment) will be transported to the on-site groundwater treatment plant for disposal. 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.

All IDW will be managed, removed, transported, and properly disposed of following all applicable state and federal regulations. Each truckload of soil will need a separate manifest, which will be developed onsite and forwarded via email or fax to the Army for review and signature. A representative from the Army will review the manifest, sign and return via email or fax. A hardcopy of the signed manifest, with appropriate number of copies, will be provided to the driver of the truck before the truck leaves the site.

3.2.5 Decontamination of Equipment and Personnel

Decontamination of equipment and personnel will be performed as discussed in the Installation-Wide Work Plan.

3.2.6 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. The field work is anticipated to 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.

3.2.7 Site Survey

The excavation area will be surveyed by a licensed land surveyor prior to excavation activities. If additional excavation is necessary, the area of additional excavation will also be surveyed. 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.

3.2.8 Quality Assurance/Quality Control

All work will be performed in accordance with the Installation-Wide Work Plan in place at the time field work is conducted. The Installation-Wide Work Plan provides information on QA/QC procedures for this project, identifies personnel, procedures, controls, instructions, tests, verifications, documents, and forms to be used and the types of records to be maintained. The Installation-Wide Work Plan also addresses quality control requirements specific to each major feature of work.

3.3 Surface Water Monitoring

To ensure that soil at LHAAP-50 is not contaminating nearby surface water, surface water samples will be collected quarterly from GPW-1 for two years following completion of the soil excavation. If perchlorate levels in the creek are consistently above TCEQ groundwater MSC for residential use (GW-Res) after two years of monitoring, then additional evaluation will be conducted and any proposed actions will be included in the annual report.

Surface water sample locations are presented in **Figure 3-2**; details of surface water monitoring are presented in Section 4.2.7.1.

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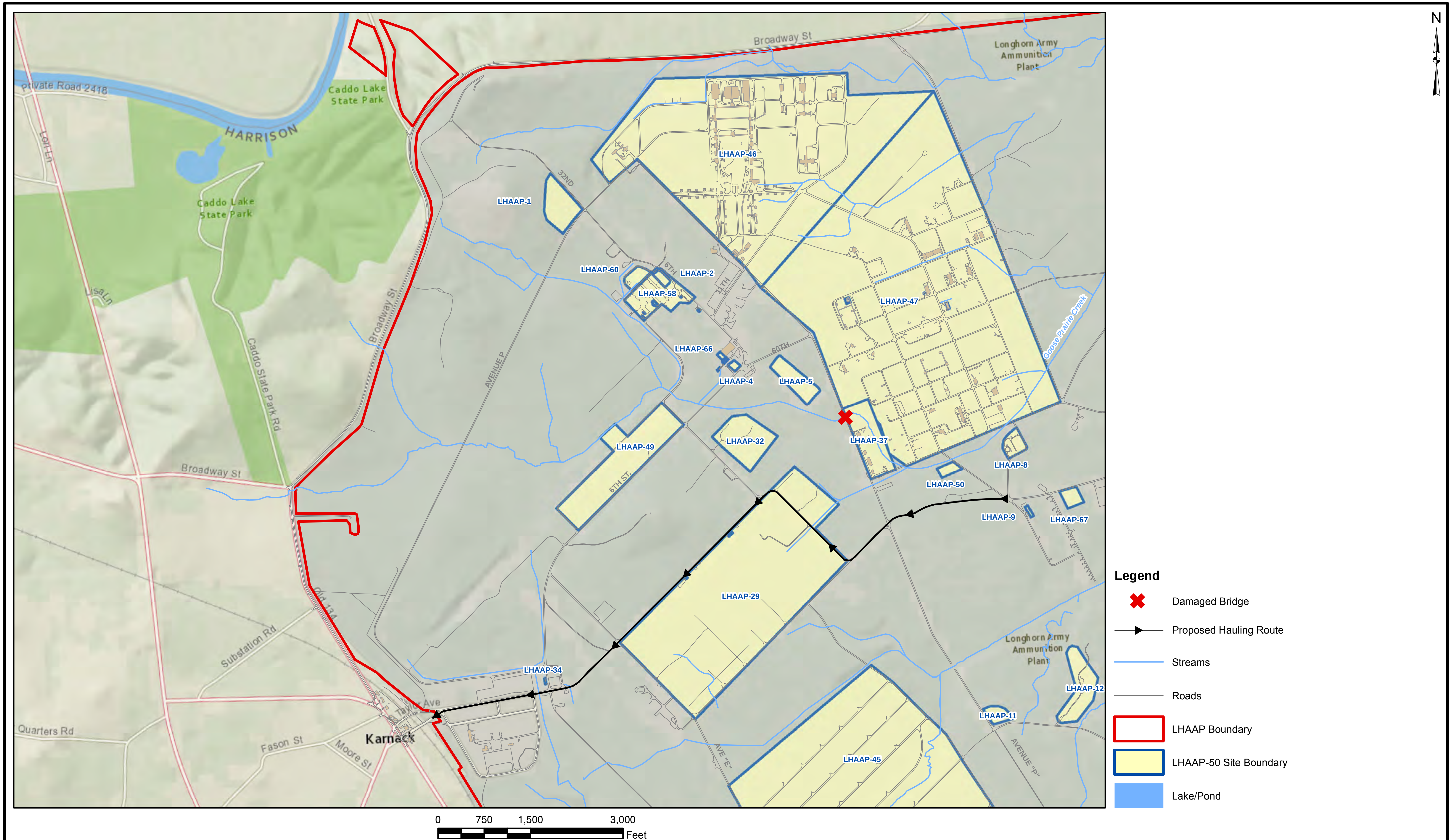
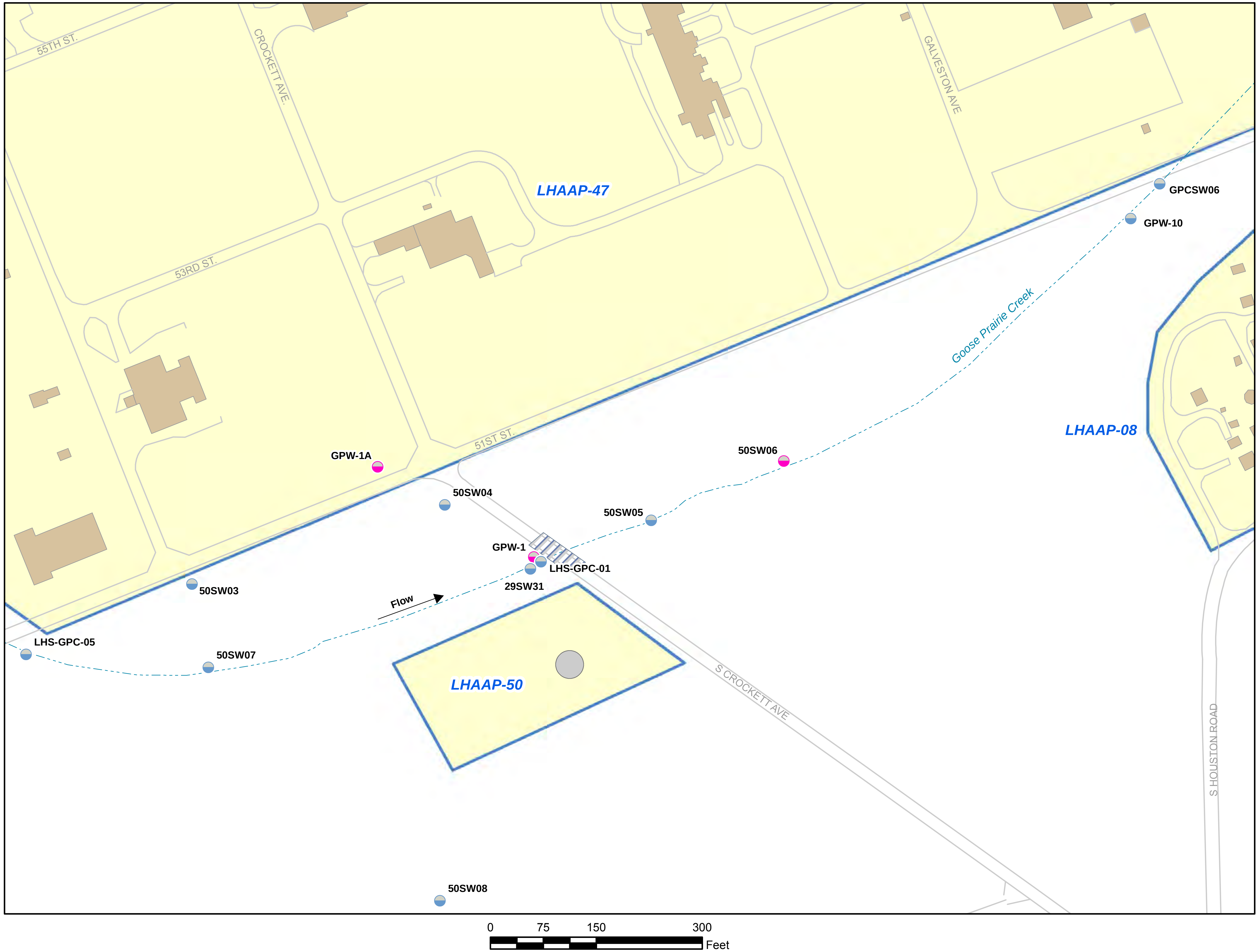


AECOM

Figure 3-1
Proposed Haul Route
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

January 2013



Legend

- Surface Water Location
- Proposed Surface Water Location
- Groundwater Elevation Contour
- Roads
- Goose Prairie Creek
- Bridges
- Buildings
- Former Storage Tank Location
- Site Boundaries

Note:
GPW-1A is located at the culvert on the north sideof the road to evaluate contributions from LHAAP-47.The water from this culvert flows into Goose PrairieCreek near LHAAP-50.

AECOM

Figure 3-2
Proposed Surface Water Sampling Locations
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013

4 MONITORED NATURAL ATTENUATION

This section discusses the objectives and details of the MNA program under the RA.

COCs have been detected in two groundwater zones at the LHAAP-50 site; shallow and intermediate. The nature and extent of groundwater contamination in the shallow and intermediate zones is discussed in section 1.2.2.

Performance monitoring will be conducted to evaluate remedy effectiveness and to ensure protection of human health and the environment. Performance monitoring will include groundwater and surface water monitoring. The groundwater monitoring program is designed to evaluate and monitor natural attenuation of COCs in both shallow and intermediate zone (and potentially deep zone) groundwater and the surface water monitoring program is designed to evaluate potential migration of groundwater COCs to surface water. Additional groundwater wells drilled as part of this work plan will be used in the monitoring plan.

The combined monitoring program shall meet the following objectives (USEPA, 1999):

- Demonstrate that natural attenuation is occurring according to expectations;
- Detect changes in environmental conditions (e.g. geochemical, hydrogeologic etc.) that may reduce the efficacy of any of the natural attenuation processes;
- Identify potentially toxic and/or mobile transformation products;
- Verify that the plume(s) is not expanding;
- Verify no unacceptable impact to downgradient receptors;
- Detect new releases of contaminants to the environment that could impact effectiveness of the natural attenuation remedy; and,
- Verify attainment of the remediation objectives.

4.1 Plume Delineation Activities

The shallow and intermediate groundwater plumes are sufficiently bounded to establish the limits of an appropriate monitoring program. However, the work described below is planned to refine the plume shape.

4.1.1 Shallow and Intermediate Groundwater Zone Investigation

In order to refine the shape and boundary of the VOC and perchlorate plumes, discrete groundwater samples will be collected using DPT drilling from approximately 13 locations located both within and outside the existing shallow and intermediate zone plumes and analyzed for VOCs and perchlorate. The approximate locations of the DPT locations are depicted in **Figure 4-1**. The exact locations will be adjusted in the field based on site conditions and available data. **Table 4-1** provides the rationale for proposed DPT points. Additional DPT sampling points may be installed if deemed necessary prior to installation of permanent shallow groundwater monitoring wells.

4.1.2 Additional Soil Sampling

As part of the direct-push activities, soil samples will be collected from 50DPT03 at various depths above the groundwater interface and analyzed for perchlorate. The sample method, sample containers, and sample preservation methods are provide in Table 4-5. This additional soil sampling is to evaluate whether the soil across the street from the site, in the vicinity of STEP-50DW02 and GPSAS50-2, may be a source of perchlorate contamination (Shaw 2011). High concentrations of perchlorate in groundwater were observed at STEP-50DW02 and GPSAS50-2 in 2002 and 2001, respectively.

If an additional soil source is found, step out sampling will be completed in four directions radially outward from the initial boring with step-outs continuing until the clean-up level is achieved. All soil within the boundary identified above the clean-up level will be removed to the depth at which the initial boring was below the clean-up level. Any required excavation will be completed in conjunction with currently planned excavation work for LHAAP-50.

4.1.3 Shallow Groundwater Zone

The shallow zone groundwater plume based on groundwater data from permanent monitoring wells is depicted in **Figures 1-4** and **1-5**.

The results from the additional investigation will be used to select locations for up to 14 additional permanent monitoring wells. **Figure 4-2** depicts the approximate expected locations of the proposed monitoring wells ("A" through "N"), which are subject to change based upon the findings of the discrete groundwater sampling effort. **Table 4-2** provides the rationale for proposed shallow monitoring well locations. The use of existing wells within and outside of the current TCE shallow zone plume limits will be maximized as they provide historic data that can be used for MNA evaluation.

4.1.4 Intermediate and Deep Groundwater Zones

The intermediate zone groundwater plume is depicted in **Figure 1-5** with one monitoring well (50WW06) currently located within the plume.

The source of contamination in the intermediate zone remains undetermined; the perchlorate source may be attributed to a source at LHAAP-47 or the perchlorate at LHAAP-50 (Shaw, 2011). Approximately 5 new permanent monitoring wells will be installed in the intermediate zone to determine the source of the perchlorate contamination and delineate the edges of the plume. Two wells will be installed within the plume and three more wells will be installed outside the plume in the intermediate zone. One monitoring well (part of a well cluster) will be installed in the deep zone to ensure that groundwater from the shallow/intermediate zone is not contaminating the deep zone. The exact locations will be adjusted in the field based on site conditions and available data. Each well will be sampled for VOCs and perchlorate.

Figure 4-3 depicts the approximate locations of the proposed monitoring wells, subject to change based on conditions observed in the field. **Table 4-3** provides the rationale for proposed intermediate and deep monitoring well locations. The use of existing wells within and outside of the current COC intermediate zone plume limits will be maximized as they provide historic data that can be used for MNA evaluation.

4.2 MNA Implementation

This section describes the field and other activities planned at the LHAAP-50 site that relate to the MNA component of the groundwater remedy. General activities would apply to any site with similar characteristics. Site-specific activities are described in associated subsections.

4.2.1 Pre-mobilization Activities

A pre-construction meeting will be held prior to initiation of field activities.

A survey to determine the metes-and-bounds for the LUC and the notification of non-residential use will be conducted. The survey will be performed by a state-licensed surveyor and the coordinate system will be Texas State Plane, North American Datum (NAD) 1983.

4.2.2 Preliminary Activities/Mobilization

A field schedule will be finalized with the selected drilling contractor prior to mobilizing to the LHAAP-50 site. An on-site project kickoff meeting will be held with the contractor to review the scope of work including the drilling locations, utility clearances, and health and safety issues.

4.2.3 Site/Utility Clearance

Existing utility maps will be utilized to locate subsurface utilities. All proposed borehole locations will be marked, Underground Service Alert (One Call) will be notified at least two working days prior to intrusive work, and the utility clearance SOP will be followed

4.2.4 Direct Push Groundwater Sampling

DPT will be used to collect discrete groundwater samples to refine the understanding of the shallow and intermediate plumes to assist in implementing the remedy. A minimum of 13 DPT groundwater samples will be collected prior to installing monitoring wells. Discrete groundwater samples will be collected using a Geoprobe SP-15® or equivalent which has a 3.5-foot screen length. The drilling equipment will be decontaminated after each sample is collected to prevent cross-contamination.

The collected groundwater samples will be analyzed for VOCs utilizing USEPA Method 8260B and perchlorate utilizing USEPA Method 6850. Samples collected for perchlorate analysis will be field-filtered with a high capacity, in-line 0.2 micron filter. Sample analyses and analytical results validation will be conducted in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

4.2.5 Monitoring Well Installation

A total of 14 new monitoring wells are proposed in the shallow zone, 5 new monitoring wells are proposed in the intermediate zone, and 1 new monitoring well is proposed in the deep zone. Monitoring wells will be installed using hollow-stem auger, mud rotary, or sonic drilling techniques as appropriate. Parameters for drilling method selection are presented in the Monitoring Well Installation Standard Operating Procedure, included in the Installation-Wide Work Plan. Three existing wells, 50WW02, 50WW03, and 50WW04 have been dry and these three wells will be replaced during installation of new monitoring wells.

Well installation and development will follow the procedures specified in the Installation-Wide Work Plan in place at the time field work is conducted.

4.2.6 Site Survey

After completion of the sampling activities, the monitoring wells 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.

4.2.7 MNA Program Groundwater Monitoring

Groundwater monitoring will be performed to demonstrate effectiveness of the MNA remedy. A total of up to 28 monitoring wells are proposed to be included in the initial monitoring program for collection and analysis of groundwater samples. Of the 30 wells, 19 are in the shallow zone, 8 are in the intermediate zone, and one is in the deep groundwater zone. Shallow monitoring wells are shown on **Figure 4-4**, and intermediate and deep wells are shown on **Figure 4-5**. These wells have been selected for their placement relative to the VOC and perchlorate plumes to monitor the effectiveness of natural attenuation at the LHAAP-50 site. The number of monitoring wells included in the network may be reduced based on results of the initial data collection activities. **Table 4-4** indicates the wells in each zone and the analytes for each well. **Table 4-5** lists the analytes, test methods, and other sampling information.

Prior to arriving in the field, well construction information will be tabulated so that that the distance from the top of casing to the bottom of the screen is available for field personnel. Prior to sampling, depth to groundwater measurements will be recorded using an interface probe capable of detecting the presence of free phase (either light or dense non-aqueous phase) hydrocarbons. The depth to groundwater will be measured from a specified location on the top of the casing where elevation has been determined, and recorded on the field log. The depth to groundwater will be compared to the depth to the bottom of the screened interval to determine whether the water level observed represents groundwater within the screened interval or water within the well sump. Groundwater elevations determined to be within the well sump will be excluded from results used to construct a potentiometric map for the site.

Prior to collection of groundwater samples, each well will be also be purged and general water quality parameters (temperature, pH, specific conductivity, dissolved oxygen, oxidation reduction potential, and turbidity) will be collected. Upon completion of these activities, groundwater samples will be collected and placed into laboratory-provided containers. The containerized samples will be properly labeled, placed within ice-filled coolers, and shipped to the laboratory under chain-of-custody control for analytical testing. All well purging, groundwater sampling, sample labeling and shipping activities will be conducted in accordance with the Installation-Wide Work Plan, and applicable Standard Operating Procedures (SOP) in place when field work is conducted.

MNA groundwater monitoring will be performed quarterly for two years. Samples from a subset of the monitoring wells will also be tested for the following biogeochemical parameters: alkalinity, common anions (chloride, sulfate, nitrate, nitrite), sulfide, total organic carbon (TOC), dissolved iron and manganese, total phosphorus, carbon dioxide, dissolved gases (methane, ethane, and ethene), and total iron. These wells include:

- Shallow zone: 50WW02, new wells A1, B, C, D1, H, L, M, and N.
- Intermediate zone: 50WW06, new wells D2, P, and Q

If data from field or microcosm studies is necessary to establish the third line of evidence for MNA, if the first two lines of evidence are inadequate or inconclusive (see Section 5.1.4), and/or if the need for a contingency remedy is evaluated, the following additional parameters may be collected: Dehalococcoides ethenogenes (DHC), hydrogen, and volatile fatty acids (VFAs) (USEPA, 1998). The analyses of these additional parameters will be deferred until the initial two-year groundwater monitoring program is concluded.

Sample analyses and analytical results validation will be conducted in accordance with the Installation-Wide Work Plan in place when field work is conducted.

4.2.7.1 Surface Water Monitoring

Quarterly performance monitoring of surface water from Goose Prairie Creek adjacent to the LHAAP-50 site will be conducted at GPW-1 for two years following soil excavation (**Figure 3-2)**. Analytical data from this location will be used to monitor for contaminant contributions from soil runoff from the perchlorate-contaminated portion of LHAAP-50

Two additional surface water samples will be collected from locations GPW-1A and 50SW06. The new location, GPW-1A, will be located in a ditch at the upgradient end of a culvert in LHAAP-47 to monitor for contaminant contributions in runoff from the perchlorate-contaminated portion of LHAAP-47. Location 50SW06 has been selected for monitoring as a potential discharge point for groundwater to surface water contamination. If the groundwater plume extents are significantly modified following monitoring well installation, the inclusion of monitoring point 50SW06 may be re-evaluated. **Table 4-6** provides the rationale for sample collection at each proposed location.

Surface water samples will be analyzed for VOCs and perchlorate. Evaluation of this data will be included in the annual reports to verify that the RAOs are achieved. The frequency and location of sampling may be modified after evaluation of data. If perchlorate levels in the creek are consistently above TCEQ groundwater MSC for residential use (GW-Res) after two years of monitoring, then additional evaluation will be conducted and any proposed actions will be included in the annual evaluation report submitted after Year 2. The need to continue surface water sampling will be evaluated during the five-year review.

Surface water sampling, sample labeling and shipping activities will be conducted in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

4.2.7.2 Long-term Monitoring

After the first two years of quarterly groundwater monitoring, the effectiveness of MNA will be evaluated. If the MNA evaluation determines MNA is effective, and leading to the achievement of RAOs, the long-term monitoring frequency will be reduced to semi-annual for three additional years, then performed annually until the next CERCLA five-year review. The suite of analyses performed will also be limited to VOCs and perchlorate to be used for ongoing confirmation of declining concentration trends. Further reductions in sampling frequency will depend upon results of CERCLA five-year reviews, but sampling will continue at least once every five years until cleanup levels are attained.

4.2.8 Investigation Derived Wastes

Investigation-Derived Waste (IDW) generated during the investigation and monitoring activities will include disposable sampling equipment, purge water, equipment decontamination fluids, and personal protection equipment (PPE). IDW (except PPE and disposable sampling equipment) will be containerized and stored on-site 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.

4.2.9 Decontamination of Equipment and Personnel

Decontamination of equipment and personnel will be performed as discussed in the Installation-Wide Work Plan in place at the time field work is conducted.

4.3 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. The field work is anticipated to 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.

4.4 Quality Assurance/Quality Control

All work will be performed in accordance with the Installation-Wide Work Plan in place at the time field work is conducted. The Installation-Wide Work Plan provides information on QA/QC procedures for this project, identifies personnel, procedures, controls, instructions, tests, verifications, documents, and forms to be used and the types of records to be maintained. The Installation-Wide Work Plan also addresses quality control requirements specific to each major feature of work.

Table 4-1: Rationale for Selection of Proposed DPT Points in Shallow and Intermediate Groundwater Zone

Proposed DPT	Location relative to the Plume	Rationale/Purpose
50DPT01	Downgradient of source area, within site boundary	Refine plume boundaries; optimize well installation
50DPT02	Near plume source area, within site boundary	Refine plume boundaries; optimize well installation
50DPT03	Downgradient of source area, near perchlorate hot spot	Refine plume boundaries; optimize well installation
50DPT04	Downgradient of source area, within perchlorate plume	Refine plume boundaries; optimize well installation
50DPT05	Downgradient of shallow perchlorate plume	Refine plume boundaries; optimize well installation
50DPT06	Upgradient of plume source area, within site boundary	Refine plume boundaries; optimize well installation
50DPT07	Downgradient of shallow and intermediate perchlorate plumes	Refine plume boundaries; optimize well installation
50DPT08	Near shallow plume edge	Refine plume boundaries; optimize well installation
50DPT09	Near plume edge, refine extent of shallow plume	Refine plume boundaries; optimize well installation
50DPT10	Near plume edge, refine downgradient extent of shallow and intermediate plumes	Refine plume boundaries; optimize well installation
50DPT11	Outside shallow plume boundary; define area of comingled LHAAP-47 and LHAAP-50 intermediate perchlorate plumes	Refine plume boundaries; optimize well installation
50DPT12	Outside plume boundary	Refine plume boundaries; optimize well installation
50DPT13	Outside plume boundary	Refine plume boundaries; optimize well installation

Table 4-2: Rationale for Selection of Monitoring Wells for MNA Monitoring in Shallow Groundwater Zone

Proposed Well ID	Location relative to the Plume	Rationale/Purpose
50WW02	Existing well close to source area.	Provides a data point within the perchlorate and VOC plumes to evaluate MNA. Dry well: will be replaced.
50WW03	Existing well outside the plume boundary to the southwest.	Data point to detect any new contamination flowing into plume area; evaluate lateral plume expansion. Dry well: will be replaced
50WW04	Existing well outside of the plume boundary to the south	Evaluate lateral expansion. Dry well: will be replaced.
50WW05	Existing well outside plume to the north	Evaluate lateral plume expansion.
50WW07	Existing well downgradient of the TCE plume	Evaluate downgradient expansion; verify no unacceptable impact to downgradient receptors.
New Well A1	New well close to source area within the site boundary	Provides a data point within the perchlorate and VOC plumes to evaluate MNA.
New Well B	New well downgradient of the source area	Provides another data point downgradient of the source area within the perchlorate and VOC plumes to evaluate MNA.
New Well C	New well downgradient of the eastern perchlorate plume edge and within the VOC plume	Provides a data point to evaluate downgradient expansion of perchlorate plume; data point within the VOC plume; to evaluate MNA of both plumes.
New Well D1	New well downgradient of the perchlorate plume source area	Provides a data point downgradient of the source area, within the perchlorate and VOC plumes to evaluate presence of MNA.
New Wells E, F, G, and H	New wells cross-gradient of TCE plume	Provides data points to evaluate the lateral expansion of the TCE plume.
New Well I	New well downgradient of the TCE plume source area	Provides a data point to evaluate the downgradient expansion of the TCE plume and verify no unacceptable impact to downgradient receptors
New Wells J and K	New wells cross-gradient of TCE plume	Provides a data point to evaluate the lateral expansion of the TCE plume
New Well L	New well cross-gradient of the source area	Provides a data point within the perchlorate and TCE plume to evaluate MNA.
New Well M	New well downgradient of the eastern edge of the perchlorate plume and within VOC plume	Provides a data point to evaluate downgradient expansion of perchlorate plume; to evaluate MNA of both plumes; verify no unacceptable impact to downgradient receptors.
New Well N	New well downgradient of perchlorate plume and at edge of VOC plume	Provides a data point to evaluate the downgradient expansion of the perchlorate and VOC plumes; to evaluate MNA of VOC plume; verify no unacceptable impact to downgradient receptors.

Table 4-3: Rationale for Selection of Monitoring Well for MNA Monitoring in Intermediate Groundwater Zone

Proposed DPT/Well ID	Location relative to the Plume	Rationale/Purpose
47WW38	Highest concentrations in plume in LHAAP-47 area	Evaluate presence of any toxic products in the LHAAP-47 area to help determine if perchlorate plume in the intermediate zone in LHAAP-47 and LHAAP-50 are comingled. Also used to evaluate any geochemical and microbiological changes of the dissolved plume to evaluate MNA processes.
50WW06	Existing monitoring well within the plume in the LHAAP-50 area.	Evaluate presence of any toxic products in the LHAAP-50 area to help determine if the perchlorate plume in the intermediate zone is LHAAP-47 and LHAAP-50 area comingled. Also used to evaluate geochemical and microbiological changes of the dissolved plume to evaluate MNA processes.
LHSMW54	Existing monitoring well within the plume	Evaluate downgradient expansion; verify no unacceptable impact to downgradient receptors
New Well A2	New monitoring well to be installed near the source area	Installed within the LHAAP-50 site boundary to determine if source of the intermediate zone contamination is from LHAAP-50
New Well A3	New monitoring well to be installed near the source area, deep zone.	Installed within the LHAAP-50 site boundary close to the source area to check for contamination in the deep zone close to the source area.
New Well D2	New well outside south edge of the plume	Evaluate lateral expansion of the plume.
New Well P	New well between LHAAP-47 and LHAAP-50	Evaluate any toxic products in the LHAAP-47 area to determine if the perchlorate contamination in the intermediate zone in LHAAP-50 originates from a potential source in LHAAP-47 or from LHAAP-50
New Well Q	Downgradient from highest concentration	Evaluate presence of any toxic and mobile daughter products, geochemical and microbiological changes of the dissolved plume to evaluate MNA processes.
New Well R	New well outside south edge of the plume	Evaluate lateral expansion of the plume

Table 4-4: Monitored Natural Attenuation (MNA) Performance Monitoring Wells

Monitoring Well[(1)] ID	VOCs	Perchlorate	Field Parameters**	MNA Parameters***
Shallow				
50WW02	X	X	X	X
50WW03	X	X	X	
50WW04	X	X	X	
50WW05	X	X	X	
50WW07	X	X	X	
A1*	X	X	X	X
B*	X	X	X	X
C*	X	X	X	X
D1*	X	X	X	X
E*	X	X	X	
F*	X	X	X	
G*	X	X	X	
H*	X	X	X	X
I*	X	X	X	
J*	X	X	X	
K*	X	X	X	
L*	X	X	X	X
M*	X	X	X	X
N*	X	X	X	X
Intermediate				
50WW06	X	X	X	X
47WW38	X	X	X	
LHSMW54	X	X	X	
A2*	X	X	X	
D2*	X	X	X	X
P*	X	X	X	X
Q*	X	X	X	X
R*	X	X	X	
Deep				
A3*	X	X	X	

Notes:
(1) The number of monitoring wells included in the network and the sampling frequency may be adjusted based on results of the initial data collection activities.
* - Proposed monitoring wells.

** - Field parameters to be monitored for all wells: pH, temperature, conductivity, turbidity, oxidation-reduction potential (ORP), dissolved oxygen (DO), and ferric iron.

*** - MNA parameters include alkalinity, nitrate, nitrite, sulfate, sulfide, chloride, TOC, dissolved iron and manganese, total phosphorus, carbon dioxide, dissolved gases (methane, ethane, ethene), and total iron. Optional parameters include: hydrogen, VFAs, and DHC (will be performed only for microcosm/field studies to establish the third line of evidence and will be deferred until the two-year groundwater monitoring program is concluded).

X - Well will be analyzed for that parameter.

VOCs - volatile organic compounds.

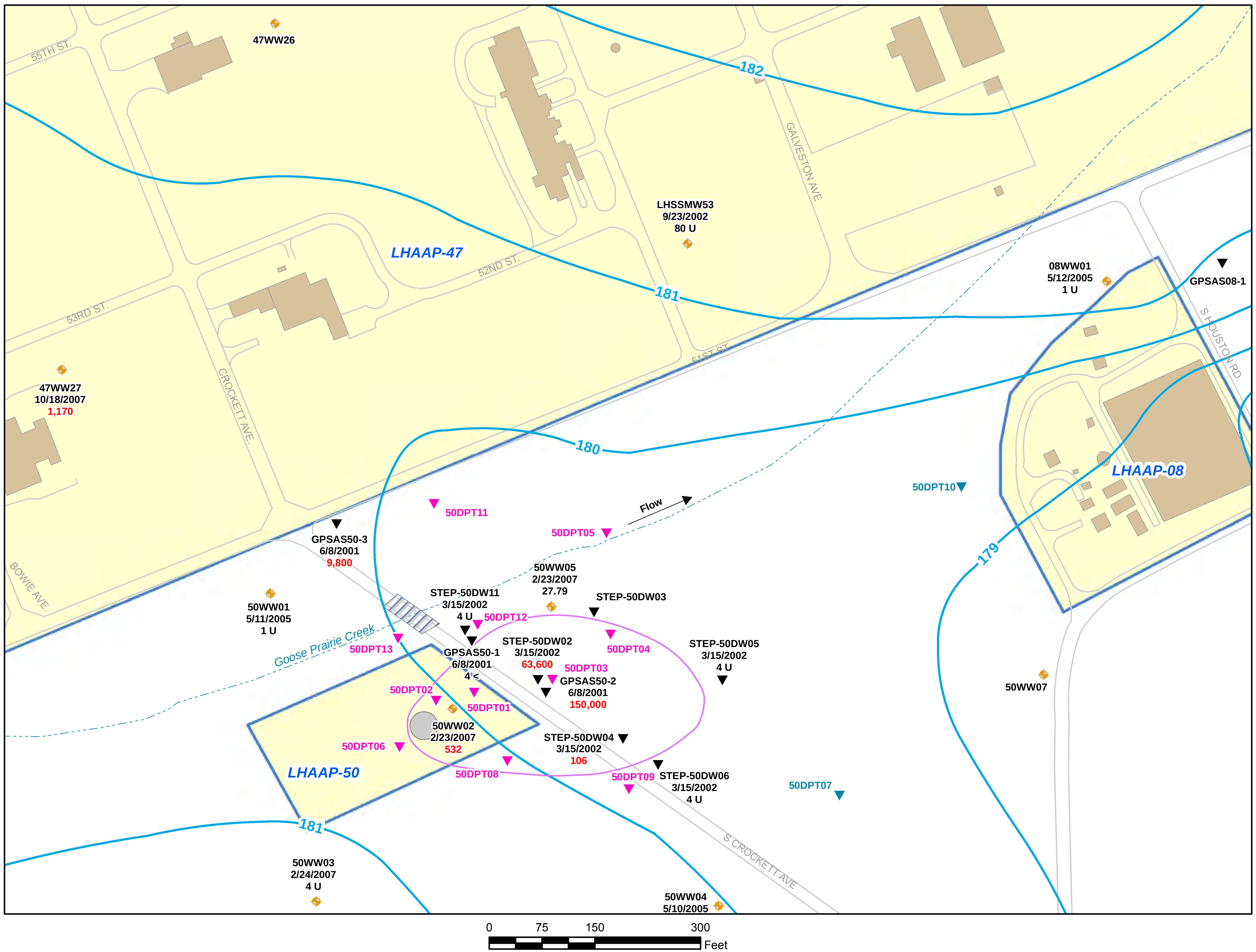
Table 4-5: Sample Methods, Containers, and Preservatives

Parameter	Minimum Sample Volume	Holding Time	Preservation	Method
Volatiles	3x40 mL glass vial with PTFE septa cap	14 days	pH < 2 HCl, Cool at 4°C, no headspace	8260B (or latest method)
Perchlorate	125 mL polyethylene bottle	28 days	Cool at 4°C; 0.2 micron filtration	USEPA 6850
Perchlorate (soil)	4 ounce jar	28 days	Cool at 4°C	USEPA 6850
Alkalinity (total, carbonate, bicarbonate)	250 mL polyethylene bottle	14 days	Cool at 4°C	USEPA 310.2
Common Anions (chloride, sulfate, nitrate, nitrite)	250 mL polyethylene bottle	28 days (Cl/SO_4) and 48 hours (individual NO_3 and NO_2)	Cool at 4°C	USEPA 300.0
Nitrate/nitrite as N	500 mL polyethylene bottle	28 days	pH < 2 H_2SO_4, Cool at 4°C	USEPA 353.2
Sulfide	250 mL polyethylene bottle	7 days	pH > 9 zinc acetate plus NaOH, Cool at 4°C	USEPA 376.1
TOC	125 mL polyethylene bottle	28 days	pH < 2 H_2SO_4 or HCL, Cool at 4°C	USEPA 415.1
Dissolved iron and manganese	500 mL polyethylene bottle	6 months	pH < 2 HNO_3, Cool at 4°C	6010B
Phosphorus, total	100 mL polyethylene bottle	28 days	pH < 2 H_2SO_4, Cool at 4°C	USEPA 365.4
Carbon dioxide and dissolved gases (methane, ethane, ethene)	3x40 mL glass vial with PTFE septa cap	14 days	Cool at 4°C	RSK 175
Iron and Thallium, total	500 mL polyethylene bottle	6 months	pH < 2 HNO_3, Cool at 4°C	6010B/6020A
Ferrous iron	NA	Immediately in field	NA	NA
Ferric iron	NA	In the field	NA	NA

Notes and Abbreviations:
The above listed volumes provide an adequate quantity of samples to analyze a matrix spike (MS) and matrix spike duplication (MSD)
°C – degrees centigrade
H_2SO_4 – sulfuric acid
HCL – hydrochloric acid
HNO_3 – nitric acid
L – liter
mL – milliliter
PTFE – polytetrafluoroethylene
NA – Not applicable
USEPA – United States Environmental Protection Agency

Table 4-6: Rationale for Selection of Surface Water Monitoring Locations

Proposed Location	Location relative to the Plume	Rationale/Purpose
GPW-1	Located immediately adjacent to the soil contamination area	Evaluate whether runoff from area of soil contamination is impacting surface water.
GPW-1A	Located adjacent to LHAAP-47	Evaluate contaminant contribution from LHAAP-47 runoff.
50SW06	Located at point where discharge from groundwater to surface water is likely	Evaluate whether groundwater is discharging to surface water. This point may be re-evaluated following groundwater investigation activities.



Legend

- ▼ (magenta) Proposed Shallow DPT Location
- ▼ (teal) Proposed Shallow/Intermediate DPT Location
- ▼ (black) DPT and Geoprobe Sample Location
- Shallow Monitoring Well
- Perchlorate Exceeding GW - Industrial (72 µg/L)
- Groundwater Elevation Contour
- Roads
- Goose Prairie Creek
- Bridges
- Buildings
- Former Storage Tank Location
- Site Boundaries

Notes:
1. Groundwater contour elevations collected in November - December 2007 were reported in feet.
2. Perchlorate concentrations were reported in micrograms per liter (µg/L).
3. COC concentrations were reported in micrograms per liter (µg/L).
4. Concentrations based on the latest data collected at each well.
5. Plume extent based on groundwater medium specific concentration for industrial use which is 72 ug/L.

AECOM

Figure 4-1
Proposed DPT Locations in Shallow and Intermediate Zone Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013

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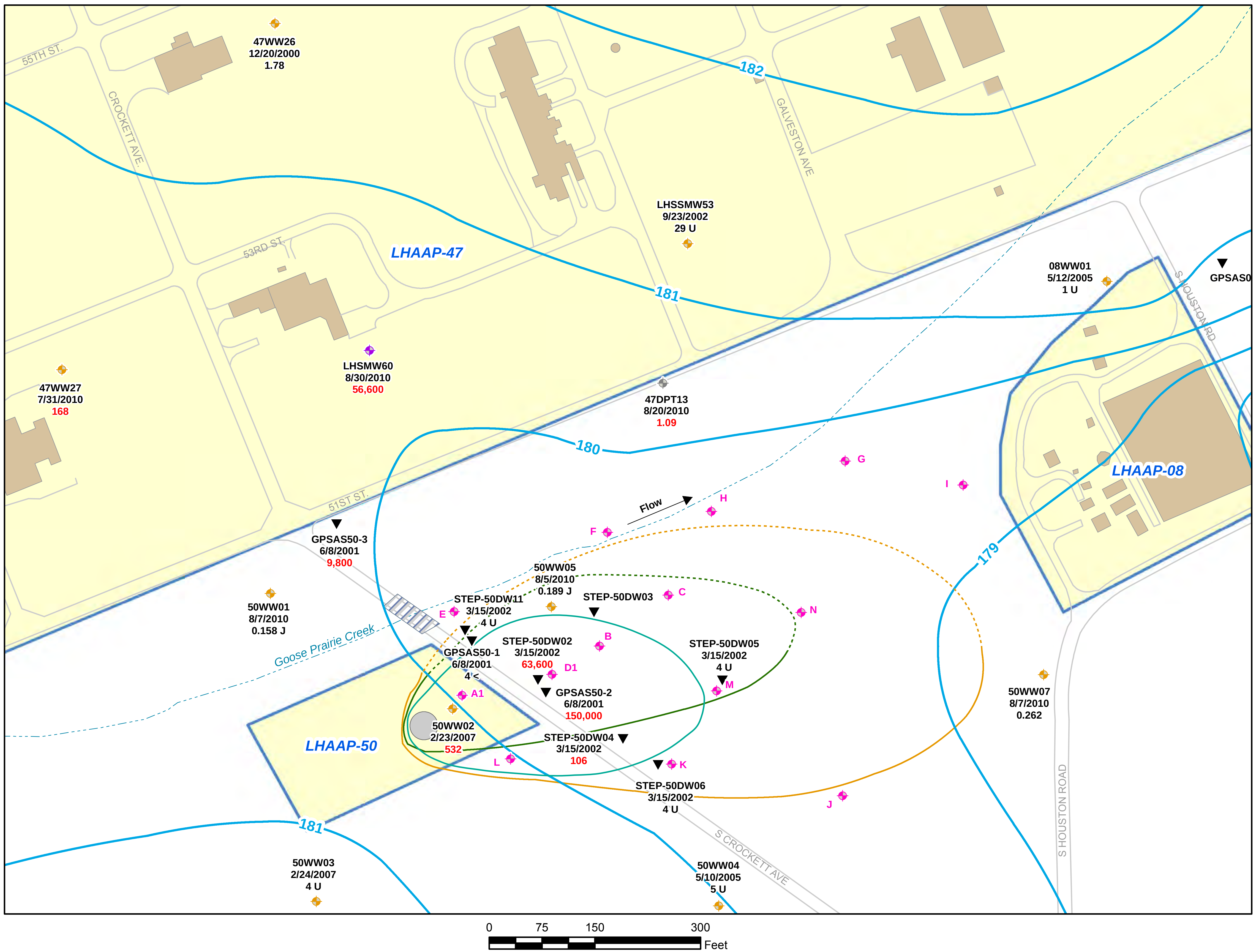

Legend

- Proposed Monitoring Well Location
- DPT and Geoprobe Sample Location
- Shallow Monitoring Well
- Shallow/Intermediate Monitoring Well
- Temporary Well Location
- 1,2-DCA Plume (5 µg/L Extent)
- TCE Plume (5 µg/L Extent)
- Perchlorate Exceeding GW - Industrial (72 µg/L)
- Groundwater Elevation Contour
- Roads
- Goose Prairie Creek
- Buildings
- Bridges
- Former Storage Tank Location
- Site Boundaries

Notes:
1. Groundwater contour elevations collected in November - December 2007 were reported in feet.
2. Perchlorate concentrations were reported in micrograms per liter (µg/L).
3. Concentrations based on the latest data collected at each well.
4. Plume extent based on groundwater medium specific concentration for industrial use which is 72 ug/L.

AECOM

Figure 4-2
Proposed Monitoring Well Locations in Shallow Zone Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

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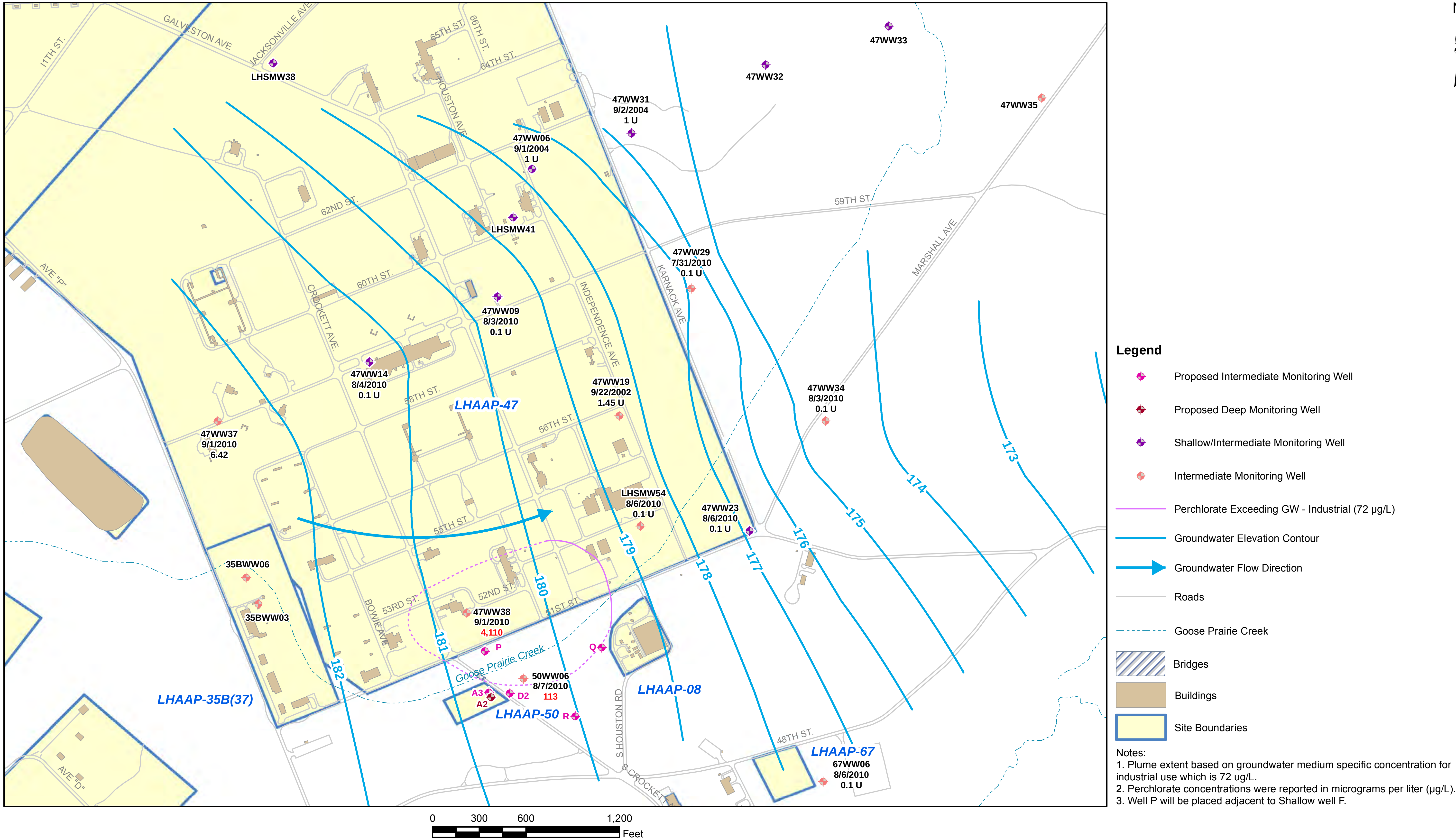
January 2013



Legend

- Proposed Intermediate Monitoring Well
- Proposed Deep Monitoring Well
- Shallow/Intermediate Monitoring Well
- Intermediate Monitoring Well
- Perchlorate Exceeding GW - Industrial (72 µg/L)
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Roads
- Goose Prairie Creek
- Bridges
- Buildings
- Site Boundaries

Notes:
1. Plume extent based on groundwater medium specific concentration for industrial use which is 72 ug/L.
2. Perchlorate concentrations were reported in micrograms per liter (µg/L).
3. Well P will be placed adjacent to Shallow well F.

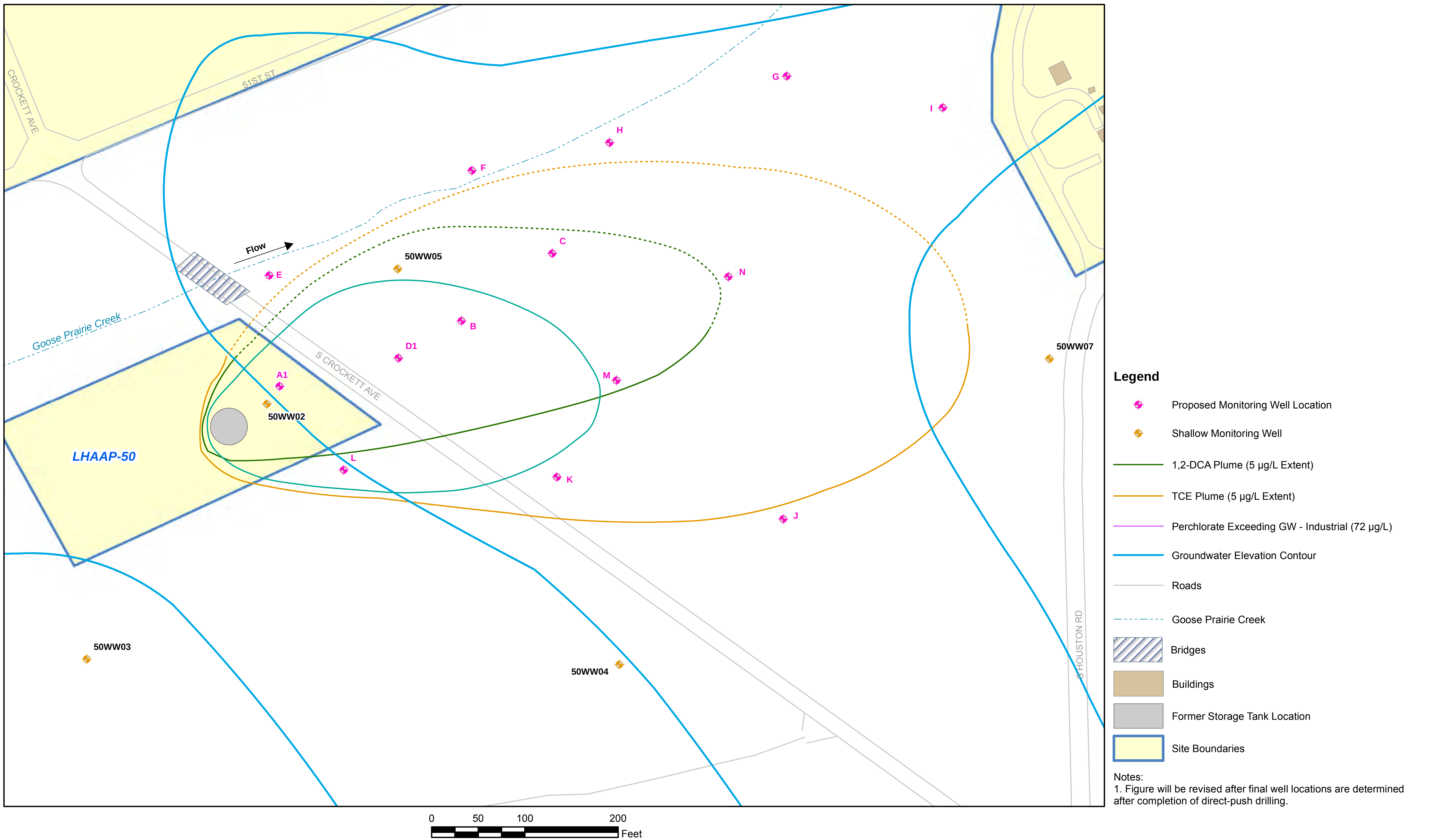
AECOM

Figure 4-3
Proposed Monitoring Well Locations in Intermediate and Deep Zone Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013

00119251

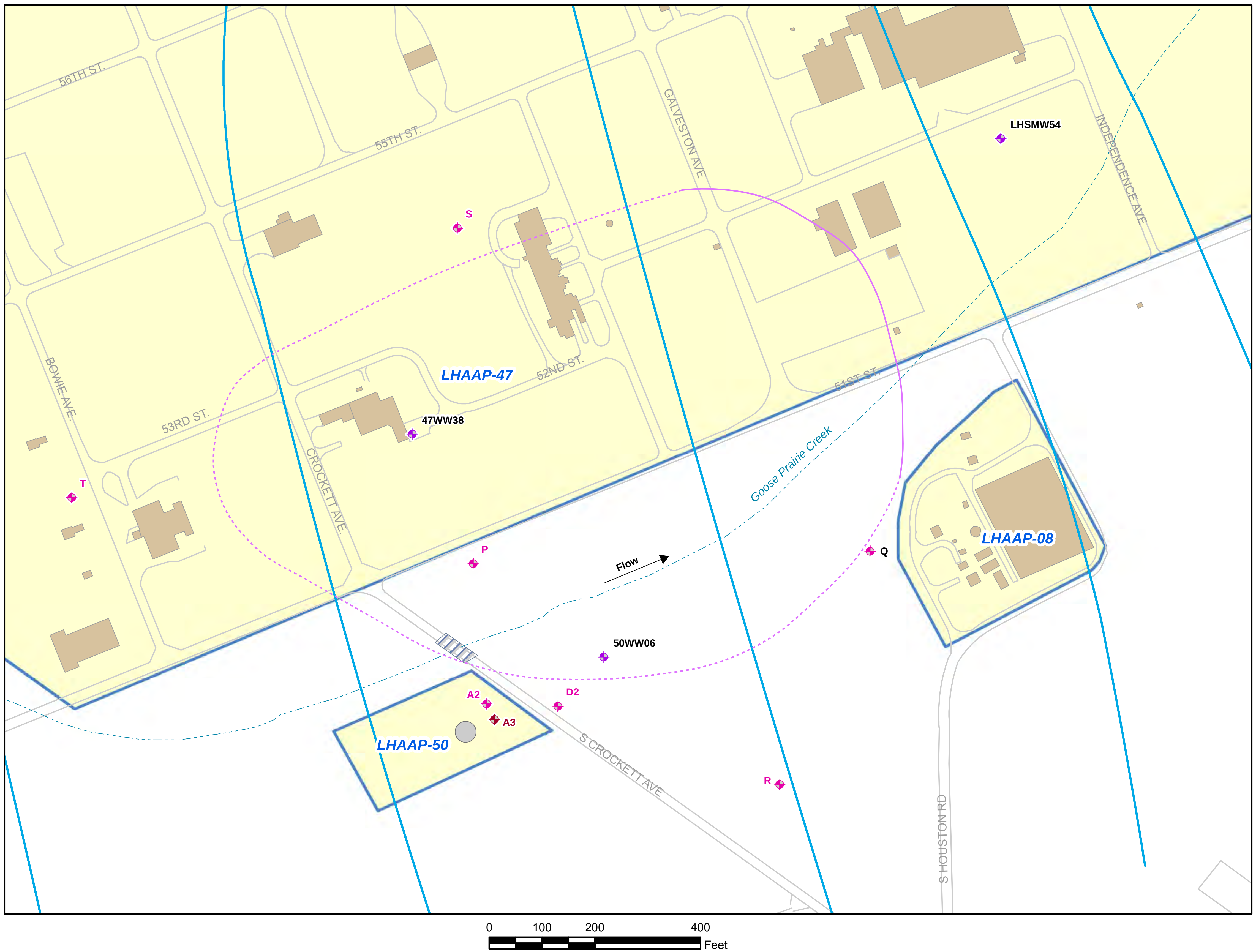


AECOM

Figure 4-4
Proposed Wells for MNA Remedy in Shallow Zone Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013



Legend

- Proposed Intermediate Monitoring Well
- Proposed Deep Monitoring Well
- Shallow/Intermediate Monitoring Well
- Perchlorate Exceeding GW - Industrial (72 µg/L)
- Groundwater Elevation Contour
- Roads
- Goose Prairie Creek
- Bridges
- Buildings
- Former Storage Tank Location
- Site Boundaries

Notes:
1. Figure will be revised after final well locations are determined.
2. D1 + D2 cluster of wells
3. A1 + A2 + A3 cluster of wells

AECOM

Figure 4-5
Proposed Wells for MNA Remedy in Intermediate and Deep Zone Groundwater
LHAAP-50
Longhorn Army Ammunition Plant
Karnack, Texas

60274185

January 2013

5 REMEDY PERFORMANCE EVALUATION AND REPORTING

Reporting will consist of formal annual reports, supplemented by the sharing of validated data as it becomes available to shorten the time between sampling and data receipt by the regulators. An initial MNA evaluation report will be completed after the first eight quarters of sampling are complete, with annual MNA reports prepared at the end of each calendar year thereafter. The CERCLA five-year reviews will be conducted and reports prepared until levels allowing for unrestricted use and unlimited exposure are achieved.

5.1 MNA Evaluation

A technical evaluation of natural attenuation potential will be performed after the first eight quarters (two years) of groundwater monitoring. This initial MNA evaluation report will be prepared using the data from the first eight quarterly sampling events and from relevant historical data. The MNA performance criteria are listed in **Table 5-1**. The MNA Evaluation Report will include:

- Figures of the site, wells, and groundwater elevation contours;
- Groundwater and surface water results;
- Plume extent and concentration over time;
- Consideration of the first and second lines of evidence for MNA (see sections 5.1.2 through 5.1.3);
- An evaluation of the effectiveness of MNA at the site; and,
- A recommendation for continued MNA, or another remedy.

5.1.1 Migration/Expansion

The MNA evaluation should demonstrate a stable or decreasing plume size if the MNA remedy is to be considered favorable at the LHAAP-50 site.

A groundwater plume is stable when the pollutant concentrations and plume footprint are relatively unchanged over time. A stable plume shows that pollutant migration in groundwater is under control.

A decreasing plume is decreasing in contaminant concentrations and/or plume footprint and is not migrating or expanding. A decreasing plume situation occurs when the attenuation rate of dissolved-phase pollutants exceeds their generation rate from all sources. A decreasing plume supports natural attenuation as a viable remedial alternative.

Monitoring must occur over a period of time sufficient to demonstrate plume stability or contaminant concentration decrease under natural conditions. This may take up to several years depending on site-specific conditions, including the monitoring data trend analysis, potential threats to beneficial uses, and other uncertainties. The non-parametric Mann-Kendall statistic will be used to evaluate solute plume stability. If monitoring data do not indicate plume stability/decrease, this may indicate that further plume remediation is necessary.

Table 5-1: Monitored Natural Attenuation (MNA) Evaluation Performance Criteria

Performance Criteria	Type	Expected Performance	Commentary
Migration/Expansion	Qualitative	Stable or decreasing plume footprint, stable footprint position	An expanding or migrating plume footprint indicates MNA should not be continued.
Concentrations	Quantitative	Declining concentrations or total CVOC mass in a majority of performance monitoring wells	First Line of Evidence
Aquifer Conditions	Quantitative	Conditions favorable for natural attenuation	Second Line of Evidence
Microcosm Studies or Modeling (if necessary)	Quantitative	Detectable presence of appropriate microorganisms	Third Line of Evidence (if necessary)

Notes:
CVOC –chlorinated volatile organic compound
MNA – monitored natural attenuation

5.1.2 First Line of Evidence

The first line of evidence relies upon comparison of current and historical groundwater data from appropriate monitoring or sampling points that demonstrates a trend of stable or decreasing contaminant mass and/or COC concentrations over time or with distance traveled from the source. Decreasing concentrations should not be solely the result of plume migration, so performance wells will be evaluated to determine if the plume is migrating.

COC concentrations in individual wells can be evaluated to calculate a time-based attenuation rate or across multiple wells through the centerline of a plume to calculate distance-based attenuation rate. These calculations will be performed using the methods contained in the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998).

Time-based attenuation rates will be calculated for any monitoring well that shows consistent COC concentrations exceeding cleanup levels. Distance-based attenuation rates will be calculated using wells with the highest concentrations parallel to the direction of groundwater flow. Data from these wells will be evaluated to determine meaningful trends of decreasing concentration and/or mass.

5.1.3 Second Line of Evidence

The second line of evidence uses chemical analytical data in mass balance to show that decreases in contaminant and electron acceptor/donor concentrations can be directly correlated to increases in metabolic end products or daughter compounds. The evidence can be used to show groundwater conditions are sufficiently favorable to natural attenuation so that degradation of chlorinated solvent contaminants can occur.

The second line of evidence evaluates biogeochemical parameters such as nitrates, sulfates, chloride, TOC, etc. The results of these analyses will be interpreted using the *Technical Protocol* *for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998) to determine whether conditions are favorable for continued MNA.

5.1.4 Third Line of Evidence

The third line of evidence, if necessary, consists of predictive modeling studies and other laboratory/field studies that demonstrate an understanding of the natural attenuation processes occurring at the site and their effectiveness in controlling plume migration and decreasing COC concentrations.

For the MNA evaluation, the presence of microorganisms in the groundwater capable of degrading the COCs will be considered the favorable condition supporting continued MNA.

Additional analyses (e.g. DHC, hydrogen, and volatile fatty acids) related to general laboratory/microcosm studies will be deferred until such time as the initial two-year groundwater monitoring program is concluded and such a study is found necessary.

5.1.5 MNA Performance Evaluation Report

The Final MNA Performance Evaluation Report, following USEPA and TCEQ review and comment incorporation, will determine whether MNA continues to be the remedial action applied at the LHAAP-50 site, or whether another more aggressive treatment should be evaluated as a contingency remedy.

The first and second lines of evidence will be evaluated for decreasing COC concentrations and suitable geochemical conditions to demonstrate MNA. If it is determined that MNA will not achieve RAOs, this document will be amended to include design and implementation of a contingency remedy. The MNA Performance Evaluation Report will also include recommendations for future LTM and well abandonments.

5.2 LTM Annual Reports

An annual report will be prepared at the end of each year of LTM to present groundwater monitoring results, a description of field activities, and to document other relevant information that may be considered useful for the CERCLA five-year review.

Perimeter well data will be evaluated for plume migration while the data from wells within the plume areas will be evaluated for MNA performance.

The annual report will also provide recommendations, if possible, for reducing the number of monitoring wells to be included in the monitoring program and/or frequency of monitoring events.

5.3 Five-year Review Reports

CERCLA five-year reviews will be performed for the LHAAP-50 site. The five-year review report will present summaries of information from the annual reports as from the five-year sampling event, and recommend the future course of action. The progress towards cleanup levels will be evaluated in the five-year review report.

6 SCHEDULE

Table 6-1 shows the estimated duration for each major site activity and timeline. This schedule is considered to be reasonable and achievable. Adverse weather and unknown site conditions could adversely affect this schedule.

Table 6-1: Durations for Major Site Activities

Activities	Duration	Elapsed Time
Establish Land Use Control	1 month	1 month
Soil Excavation	10 days	-
Monitoring Network Confirmation Sampling Event	5 days	-
Monitoring Well Installation	15 days	-
Year 1 Quarterly MNA Sampling (4 events)	5 days per event	1 year
Year 2 Quarterly MNA Sampling (4 events)	5 days per event	2 years
MNA Performance Evaluation Report (Final Document)	6 months	2.5 years
Well Abandonment/Replacement	5 days	-
Three years of semiannual monitoring and associated annual reporting	3 years	5 years
Five-year Review	6 months	5 years
Annual Sampling (years 5 through 10)	5 years	10 years
Sample once every five years (repeat activity until cleanup levels are achieved)	-	15, 20, 25, 30 years
Achieve Cleanup Levels	-	23 to 50 years

Notes:
- Time frame to achieve cleanup levels is estimated based on the Remedial Design document (Shaw, 2011).
- Schedule revision expected after MNA Performance Evaluation and CERCLA five-year review.

7 REFERENCES

Jacobs Engineering Group, Inc. (Jacobs), 2002, *Final Remedial Investigation Report for the Group 4 sites, Sites 35A, 35B, 35C, 46, 47, 48, 50, and 60, and Goose Prairie Creek, Longhorn Army Ammunition Plant, Karnack, Texas*, Oak Ridge, TN, January.

Shaw Environmental, Inc. (Shaw), 2009, *Final Feasibility Study, LHAAP-50, Former Sump Water Tank, Group 4, Karnack, Texas*, December.

Shaw, 2010a, *Record of Decision, LHAAP-50, Former Sump Water Tank, Group 4, Longhorn Army Ammunition Plant, Karnack, Texas*, September

Shaw, 2010b, *Installation Wide Work Plan, Longhorn Army Ammunition Plant, Karnack, Texas,* May.

Shaw, 2011, *Final Remedial Design, LHAAP-50, Former Sump Water Tank, Group 4, Longhorn Army Ammunition Plant, Karnack, Texas*, September.

USEPA, 1998, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*, EPA/600/R-98/128, September.

USEPA, 1999, *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, Directive 9200.4-17P, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

APPENDIX A: SAMPLE ANNUAL LAND USE CONTROL COMPLIANCE CERTIFICATION DOCUMENTATION

Sample Annual Land Use Control Compliance Certification Documentation

In accordance with the Remedial Design dated _____________________ for LHAAP-50 a certification of site was conducted by _______________________________ [indicate transferee] on _____________________.

A summary of land use control mechanisms is as follows:

- Groundwater restriction - restriction of the use of groundwater to environmental monitoring and testing until cleanup levels are met. The restriction against residential use of groundwater will remain in effect until the levels of the COCs in groundwater allow unrestricted use and unlimited exposure (UUUE). [Indicate whether groundwater restrictions are still required at LHAAP-50]

A summary of compliance with land use and restriction covenants is as follows:

- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-50.

I, the undersigned, do document that the certification was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: ____________________________

Name/Title: ____________________________

Signature: ____________________________

Annual compliance certification forms shall be completed no later than March 1 of each year for the previous calendar year.

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

June 28, 2013

DAIM-ODB-LO

Mr. Rich Mayer
US Environmental Protection Agency
Superfund Division (6SF-AT)
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Final Remedial Action Work Plan, LHAAP-37,
Longhorn Army Ammunition Plant, Karnack, Texas, June 2013

Dear Mr. Mayer,

The revised Response to Comments and the above-referenced document are being transmitted to you for your records. In accordance with the FFA, the April 2013 Draft Final was revised during informal dispute resolution between the Parties, EPA Region 6 and Longhorn Army Ammunition Plant.

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:
A. Palmie, TCEQ, Austin, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
J. Lambert, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
M. Plitnik, USAEC, San Antonio, TX
D. Wacker, AECOM – San Antonio, TX (for project files)

00119261

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

June 28, 2013

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 Remedial Action Work Plan, LHAAP-37,
Longhorn Army Ammunition Plant, Karnack, Texas, June 2013

Dear Ms. Palmie,

The revised Response to Comments and the above-referenced document are being transmitted to you for your records. In accordance with the FFA, the April 2013 Draft Final was revised during informal dispute resolution between the Parties, EPA Region 6 and Longhorn Army Ammunition Plant.

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
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
J. Lambert, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
M. Plitnik, USAEC, San Antonio, TX
D. Wacker, AECOM, San Antonio, TX (for project files)

00119262

FINAL
REMEDIAL ACTION WORK PLAN
FOR
LHAAP-35B (37), CHEMICAL LABORATORY
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Prepared For:

U.S. Army Corps of Engineers

Prepared By:

AECOM Technical Services

June 2013

FINAL
REMEDIAL ACTION WORK PLAN
FOR
LHAAP-35B (37), CHEMICAL LABORATORY
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 2013

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Acronyms and Abbreviations

µg/L	micrograms per liter
1,1-DCE	1,1-dichloroethene
AECOM	AECOM Technical Services, Inc.
ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
CERCLA	Comprehensive, Environmental Response, Compensation, and Liability Act
Cis-1,2-DCE	Cis-1,2-dichloroethene
cm/s	centimeters per second
COC	Chemical of Concern
DHC	Dehalococcoides ethenogens
DO	Dissolved Oxygen
DPT	Direct push technology
ECP	Environmental Condition of Property
ft	feet
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
IDW	Investigation Derived Waste
LHAAP	Longhorn Army Ammunition Plant
LTM	Long-term Monitoring
LUC	Land Use Control
MCL	Maximum Contaminant Level
MNA	Monitored Natural Attenuation
NCP	National Oil and Hazardous Substances Contingency Plan
NPL	National Priorities List
ORP	Oxidation-Reduction Potential
PPE	Personal Protective Equipment
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RAOs	Remedial Action Objectives
RAWP	Remedial Action Work Plan
RD	Remedial Design

ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
TAC	Texas Administrative Code
TCE	Trichloroethylene
TCEQ	Texas Commission on Environmental Quality
TOC	Total Organic Carbon
Trans-1,2-DCE	Trans-1,2-dichloroethene
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
VC	Vinyl chloride
VOC	Volatile Organic Compounds
WERS	Worldwide Environmental Remediation Services

1 INTRODUCTION

AECOM Technical Services, Inc. (AECOM) has been contracted by the U.S. Army Corps of Engineers (USACE), Tulsa District, to complete the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Action (RA) at the Longhorn Army Ammunition Plant (LHAAP) site LHAAP-35B (37) (Chemical Laboratory), located in Karnack, Texas. The LHAAP is an inactive, government-owned, formerly contractor-operated and maintained industrial facility located in central-east Texas in the northeastern corner of Harrison County. The facility occupies approximately 1,400 of its former 8,416 acres located between State Highway 43 in Karnack, Texas, and the western shore of Caddo Lake as shown in **Figure 1-1**. LHAAP was listed as a National Priorities List (NPL) site on August 9, 1990, due to threatened releases of hazardous substances, pollutants, or contaminants. The United States Environmental Protection Agency (USEPA), the Texas Water Commission (now the Texas Commission on Environmental Quality [TCEQ]), and the U.S. Army signed a Federal Facilities Agreement on December 30, 1991.

In June 2010, a combined Record of Decision (ROD) was signed covering both LHAAP-35B (37) (Chemical Laboratory) and LHAAP-67 (Aboveground Storage Tank Farm) sites due to similarities in site impacts, and because the preferred remedies are similar and concurrent (U.S. Army, 2010). LHAAP-35B (37) is located west-northwest of LHAAP-67 (**Figure 1-2**). A combined Remedial Design (RD) document detailing remedial activities required under the LHAAP-35B (37) and LHAAP-67 ROD was approved by the regulatory agencies in August 2011 (U.S. Army, 2011). This RA Work Plan (RAWP) describes the plan to implement the remedial action required under the ROD and developed by the RD to address risks associated with contaminated groundwater at LHAAP-35B (37). The RAWP for LHAAP-67 has been submitted as a separate document (AECOM, 2012).

The work described in this RAWP will be managed by USACE Tulsa District under Worldwide Environmental Remediation Services (WERS) Contract No. W912DY-09-D-0059 Task Order No. DS01.

1.1 Organization of Work Plan

This work plan is composed of the following sections:

- Section 1: “Introduction” summarizes the site background, proposed remedy including the chemicals of concern (COCs) and their respective cleanup levels, the nature and extent of contamination, the on-going bio-plug field demonstration study, and remedial action objectives (RAOs).
- Section 2: “Land Use Control Plan” describes the proposed scope of work including the implementation of activities associated with the Land Use Control (LUC) component of the remedy.
- Section 3: “Monitored Natural Attenuation” describes the plume refinement activities, groundwater and surface water sampling, health and safety procedures and quality assurance/quality control (QA/QC) procedures associated with the monitored natural attenuation (MNA) component of the remedy.

- Section 4: "Remedy Performance Evaluation and Reporting" describes the MNA performance evaluation reporting, annual long-term monitoring (LTM) reporting, and CERCLA five-year reviews to be performed for the remedy.
- Section 5: "Schedule" describes the proposed implementation schedule for the RA activities.
- Section 6: "References" provides a list of references cited in the document.

The work plan also includes Appendix A supporting the main text.

- Appendix A: Well Installation and Sampling Completion Report (February 2012)
- Appendix B: Sample Annual Land Use Control Compliance Certification Documentation

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

1.2 LHAAP-35B (37) Background

The LHAAP-35B (37) site, the former Chemical Laboratory, encompasses approximately 12.2 acres and is located in the north-central portion of LHAAP near the southwest corner of LHAAP-47 and in the northeast quadrant of the intersection of Avenue P and 51th Street (**Figure 1-2**). The site topography is relatively flat. The surface features at LHAAP-35B (37) include a mixture of asphalt-paved roads and parking areas, several administration buildings, the former Chemical Laboratory (Building 29-A), and a mixture of wooded and grassy vegetation-covered areas. The surface drainage flows into Goose Prairie Creek. The creek runs perpendicular to the western border of the site and then turns south through the east-central portion of the site and eventually flows into Caddo Lake.

The Chemical Laboratory was built during the construction of Plant 3 (1953-1955) and was originally used to support the production activities at LHAAP. These support activities included research and testing of materials used in the production processes and quality assurance testing. Also, one waste rack sump was located at the site. In 1998, the site was used as a staging area in support of investigation activities (U.S. Army, 2010).

Field investigations conducted between 1998 and 2007 identified groundwater contamination at LHAAP-35B (37) site and determined its nature and extent. Investigation results indicated that there was no significant contamination in soils (U.S. Army, 2010). The investigation data and the subsequent human health risk assessment (HHRA) indicated that the soil at the LHAAP-35B (37) site does not pose a risk to the environment or to human health under an industrial exposure scenario for a future maintenance worker (U.S. Army, 2010). However, groundwater present within the upper shallow zone posed an unacceptable cancer risk and non-cancer hazard to a future maintenance worker from hypothetical groundwater consumption. There is no groundwater contamination in the lower shallow groundwater zone and the intermediate zone (U.S. Army, 2010). The baseline ecological risk assessment (BERA) concluded that no unacceptable risk was present to the ecological receptors from the site soil and groundwater (U.S. Army, 2010).

The ROD and the RD identified the following COCs in LHAAP-35B (37) site groundwater: trichloroethene (TCE), tetrachloroethene (PCE), and 1,1-dichloroethene (1,1-DCE). The presence of these COCs in the upper shallow groundwater zone represents the primary driver for remedial action as there are no ecological risks at the LHAAP-35B (37) site. Vinyl chloride (VC) was detected in shallow zone monitoring well 35WW14 (installed in February 2012 after completion of the ROD and the RD) at a concentration above its MCL. Degradation products of PCE and TCE including cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE), and VC will be included in the performance monitoring of the groundwater remedy.

Although the HHRA reported that antimony and thallium contributed to groundwater noncarcinogenic hazard, only 2 of the 10 samples detected antimony and thallium in the 1996 investigation (pre remedial investigation) and the detections were J-qualified (i.e. the reported values were estimated values since they were below the reporting limits). The conclusions of the 2002 RI were that antimony and thallium had not been detected in the follow-on 1998 sampling event and that the groundwater at the LHAAP-35B (37) site was not considered to be contaminated with these two metals (Jacobs, 2002).

The RA to be implemented at LHAAP-35B (37) was selected and developed in accordance with the CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Contingency Plan (NCP) (40 Code of Federal Regulations 300). The selected remedy finalized in the ROD was developed based on the industrial land use scenario, which is consistent with the anticipated future use as a national wildlife refuge. A notification will be recorded at the Harrison County Courthouse to indicate that the site is suitable for non-residential use.

1.2.1 Proposed Remedy

Under the Safe Drinking Water Act, maximum contaminant levels (MCLs) have been determined for each of LHAAP-35B (37) COCs, and the MCLs will be used as cleanup levels.

Table 1-1 below presents the cleanup levels for the LHAAP-35B (37) site.

Table 1-1: Cleanup Levels

Chemical of Concern (COC)	Concentration (µg/L)	Basis
Trichloroethylene	5	MCL
Tetrachloroethylene	5	MCL
1,1-Dichloroethylene	7	MCL

Notes and Abbreviations:
µg/L – micrograms per liter
MCL – maximum contaminant level

The degradation products of PCE and TCE such as cis-1,2-DCE, trans-1,2-DCE, and VC will also be monitored and MCLs will be used as cleanup levels for these constituents. In addition, antimony and thallium will be monitored in groundwater during the first sampling event and their respective MCLs (antimony – 6 µg/L, and thallium – 2 µg/L) will be used for comparison with the analytical results to determine if further evaluation is needed.

The remedy for the LHAAP-35B (37) site is intended to protect human health by preventing exposure to contaminated groundwater and preventing contaminated groundwater from migrating into nearby surface water.

The remedy for the LHAAP-35B (37) site will include the following components:

- Land Use Control: LUC in the impacted area will ensure protection of human health by restricting the use of groundwater exceeding cleanup levels to environmental monitoring and testing only. The LUC will remain in effect until such time as the U.S. Army, TCEQ, and USEPA agree that the concentrations of COCs have met cleanup levels.
- Monitored Natural Attenuation: MNA constitutes a passive remedial action that relies on natural biological, chemical, and physical processes that act to reduce the mass and concentrations of groundwater COCs under favorable conditions. A program of MNA will be implemented to establish confidence in attenuation trends and verify that the plume is stable and will not migrate to nearby surface water at levels that may present an unacceptable risk to human health or the environment. Natural attenuation is expected to reduce contaminant concentrations to their respective clean-up levels, and return groundwater to its beneficial use, wherever practicable.

  Performance objectives for the MNA program will be re-evaluated after two years of groundwater monitoring following completion of ongoing bioplug study. During those two years, groundwater monitoring will be performed on a quarterly basis.
- Long-term Monitoring/Five-Year Reviews: LTM will begin at a semiannual frequency after the first two years until the CERCLA five-year review. In subsequent years, LTM will be performed annually until the following CERCLA five-year review. The LTM associated with this remedy will be used to track the continued effectiveness of MNA and will continue at least once every five years until the cleanup levels are achieved. The need for continued monitoring will be evaluated every five years during the CERCLA five-year review.

Based on previously performed groundwater modeling, MCLs are expected to be met through natural attenuation in 28 to 38 years for PCE, 39 to 43 years for TCE, and 16 to 21 years for 1,1-DCE at the LHAAP-35B (37) site (U.S. Army, 2010). Considering the lithologic variability, particularly the lateral and vertical gradations from sand to clay, the times to MCL may range to an order of magnitude greater.

1.2.2 Bio-plug Field Demonstration Pilot Study

A field demonstration pilot study involving the Bio-plug technology was initiated at the LHAAP-35B (37) site in February 2012. The purpose of the pilot study is to determine the feasibility of the bio-plug technology to accelerate remediation of chlorinated organic compounds in groundwater and consequent reduction of long-term remediation costs and land use restrictions. Bio-plugs are small, in-situ immobilized microbe bioreactors installed in an array within the contaminated zone. Each bio-plug well is supplied with air and nutrient distribution system which is expected to cause aerobic co-metabolism of TCE and other chlorinated organic compounds in the groundwater. Per the pilot study schedule, the bio-plug wells will be active for approximately two years from the time the study is initiated (September 2012). The study will be assessed per the following performance criteria:

- Attain MCLs for groundwater contaminants;

- Attain measurable increase in the rate of biodegradation of COCs relative to baseline biodegradation rate models;
- Measurable evidence of TCE-degrading microbial populations distributed throughout the upper shallow groundwater profile relative to baseline microbial populations; and
- No technology-related displacement of COCs outside of existing groundwater plume boundaries.

Figure 1-3 depicts the array of bio-plug points installed across the LHAAP-35B (37) site. The **Figure 1-3** also depicts the clusters of monitoring wells installed for performance monitoring during the bio-plug study.

1.2.3 Nature and Extent of Contamination

The RD document indicated that the center of mass of the TCE plume to be in proximity of shallow monitoring well 35BWW08 and the center of mass of the PCE plume to be in proximity of shallow monitoring well 35BWW04. That information was based on data collected in December 2006 and September 2007. In December 2006, maximum concentrations of TCE, PCE, and 1,1-DCE were detected in monitoring wells LHSMW58, LHSMW59, and 35BWW04 at 166, 30.1, and 3.34 µg/L, respectively. In September 2007, two additional monitoring wells, 35BWW06 and 35BWW08, were installed at the site. Well 35BWW08 was installed as a replacement well for LHSMW59, which was plugged and abandoned. Well 35BWW06 was installed in the lower shallow/intermediate zone. Four VOCs (acetone, cis-1,2-DCE, PCE, and TCE) were detected in well 35BWW08 at concentrations of 6.04, 0.407, 0.981, and 150 µg/L, respectively. No VOCs were detected in well 35BWW06. Monitoring well 35BWW02 has been observed to be dry during the previous events in 2004 and August 2006.

Since completion of the RD document, additional monitoring wells have been installed and sampled as part of the on-going bio-plug study. Wells 35BWW09, 35WW11, and 35WW14 were installed in February 2012. Locations of these wells are depicted in **Figure 1-4**. In February 2012, groundwater samples from wells 35WW04, 35WW08, 35WW09, 35WW11, and 35WW14 were analyzed for VOCs. February 2012 data indicated PCE was detected above its MCL in wells 35BWW04 and 35BWW14, TCE was detected above its MCL in wells 35BWW04, 35BWW08, 35WW09 and 35BWW14, and VC above its MCL in well 35WW14. Cis-1,2-DCE was detected above the laboratory detection limit in well 35BWW14; however, its concentration was below its MCL. 1,1-DCE was detected above the laboratory detection limit in wells 35BWW04, 35BWW08, and 35BWW09; however, the concentrations were below its MCL. No VOCs were detected above their respective MCLs in well 35BWW11. Detected VOC concentrations in wells are depicted in **Figure 1-4**. The Well Installation and Sampling Completion Report, dated February 2012 and prepared by Cherokee Nation, is included in Appendix A.

A baseline monitoring event associated with the bio-plug demonstration study was performed in July 2012 at the site. The baseline event included sampling and analysis of groundwater samples for VOCs from the eleven wells: 35BWW01, 35BWW03, 35BWW04, 35BWW05, 35BWW06, 35BWW07, 35BWW08, 35BWW09, 35BWW11, 35BWW14, and LHSMW58. The VOC data from these wells is depicted in **Figure 1-4** and Appendix C. The July 2012 data indicates TCE exceeding its MCL in wells 35BWW04, 35BWW05, 35BWW08, 35BWW09(located to the west beyond the site boundary), LHSMW58, and 35BWW14 (located on the east side of the Goose Prairie creek). PCE exceeded its MCL in wells 35BWW04, LHSMW58, and 35BWW14. 1,1-DCE was detected in well 35BWW14 above its MCL.

A performance monitoring event associated with the ongoing bio-plug study was performed in March 2013 at the site. The event included sampling and analysis of groundwater samples for VOCs from the seven wells: 35BWW04, 35BWW05, 35BWW06, 35BWW08, 35BWW09, 35BWW14, and LHSMW58. The VOC data from these wells is depicted in **Figure 1-4** and Appendix C. The March 2013 data indicates TCE exceeding its MCL in wells 35BWW04, 35BWW05, 35BWW08, 35BWW09, and 35BWW14. PCE exceeded its MCL in wells 35BWW04, LHSMW58, and 35BWW14. 1,1-DCE was detected in well 35BWW14 above its MCL.

The February 2012, July 2012, and March 2013 VOC data has been validated and data from the July 2012, where available, was used to revise the TCE and PCE plumes, as defined by their respective MCLs. The data and the TCE and PCE plumes are depicted in **Figure 1-4**. The data from February 2012, July 2012, and March 2013 will be used in evaluation of long-term performance of the remedy. The bioplug study was initiated in September 2012.

Currently, there are no shallow wells to the west/south of well 35BWW09 and to the north/northeast of well 35BWW14. Therefore, additional investigation work is proposed to refine the TCE and PCE plumes at the site.

The MNA evaluation performed by Shaw in 2007 demonstrated that natural attenuation mechanisms, including reductive biodegradation, dilution, dispersion, sorption, and volatilization may all be contributing to the observed reduction in COC concentrations at LHAAP-35B (37) (U.S. Army, 2010). Biodegradation pathways such as cometabolic or oxidative dechlorination may also have contributed to the reduction of COCs at the site (Shaw, 2007).

1.2.4 Site Geology and Hydrogeology

Topsoil at LHAAP-35B (37) site ranges in thickness from 0 to 4 feet and consists of the Quarternary silty clay underlain by alternating layers of clayey sand, silty sand, and poorly sorted sand of the Wilcox Group. The sand layers are laterally discontinuous and separated by silty clay. Groundwater at the site is encountered at 12 to 33 feet below ground surface (bgs) in the upper shallow zone, to 47 feet bgs in the lower shallow zone, and at about 70 feet bgs in the intermediate zone. Groundwater elevation contours for the shallow zone from data collected in July 2012 are included in **Figure 1-4** and indicate that the groundwater flow at the site is to the east-southeast, although the shallow groundwater flow direction may vary locally during high water table conditions due to the influence of Goose Prairie Creek. For the shallow groundwater zone, hydraulic conductivity values in the sand units ranged from a minimum value of 4.3×10^{-4} centimeters per second (cm/sec) in the northwest portion of the site to a maximum value of 7.7×10^{-4} cm/sec east of the site. The average groundwater flow rate is 0.0496 feet/day for LHAAP-35B (37), based on average hydraulic conductivity, hydraulic gradient, and effective porosity (U.S. Army, 2010).

Although not currently indicated by the data, there is a concern that COCs present in shallow groundwater beneath the LHAAP-35B (37) could potentially discharge to surface water in Goose Prairie Creek which flows into Caddo Lake, a drinking water source. The shallow groundwater potentiometric surface indicates groundwater from LHAAP-35B (37) has a predominantly east/southeasterly flow direction; although, the overall trend in groundwater flow direction at Longhorn is east-northeast towards Caddo Lake. Data indicates that the shallow zone water table is below the Goose Prairie Creek bed surveyed at 186.86 feet above mean sea level and does not discharge into Goose Prairie Creek during certain times of the year (U.S. Army, 2010). Due to uncertainties regarding the seasonal variations in the water table elevations, shallow groundwater is presumed to discharge into the Goose Prairie Creek when the water table elevations are high enough (U.S. Army, 2010).

1.2.5 Remedial Action Objectives

The RA at the LHAAP-35B (37) site must protect human health and meet applicable or relevant and appropriate requirements (ARARs). There are no ecological risks at the LHAAP-35B (37) site (U.S. Army, 2010). The proposed RA addresses human health risks for a future maintenance worker in an industrial scenario.

The RAOs for the LHAAP-35B (37) site, consistent with the reasonably anticipated future use as a national wildlife refuge, are:

- Ensure protection of human health by preventing exposure to the contaminated groundwater;
- Ensure protection of human health and the environment by preventing contaminated groundwater from migrating into nearby surface water; and,
- Ensure return of groundwater to its potential beneficial use as drinking water, wherever practicable.

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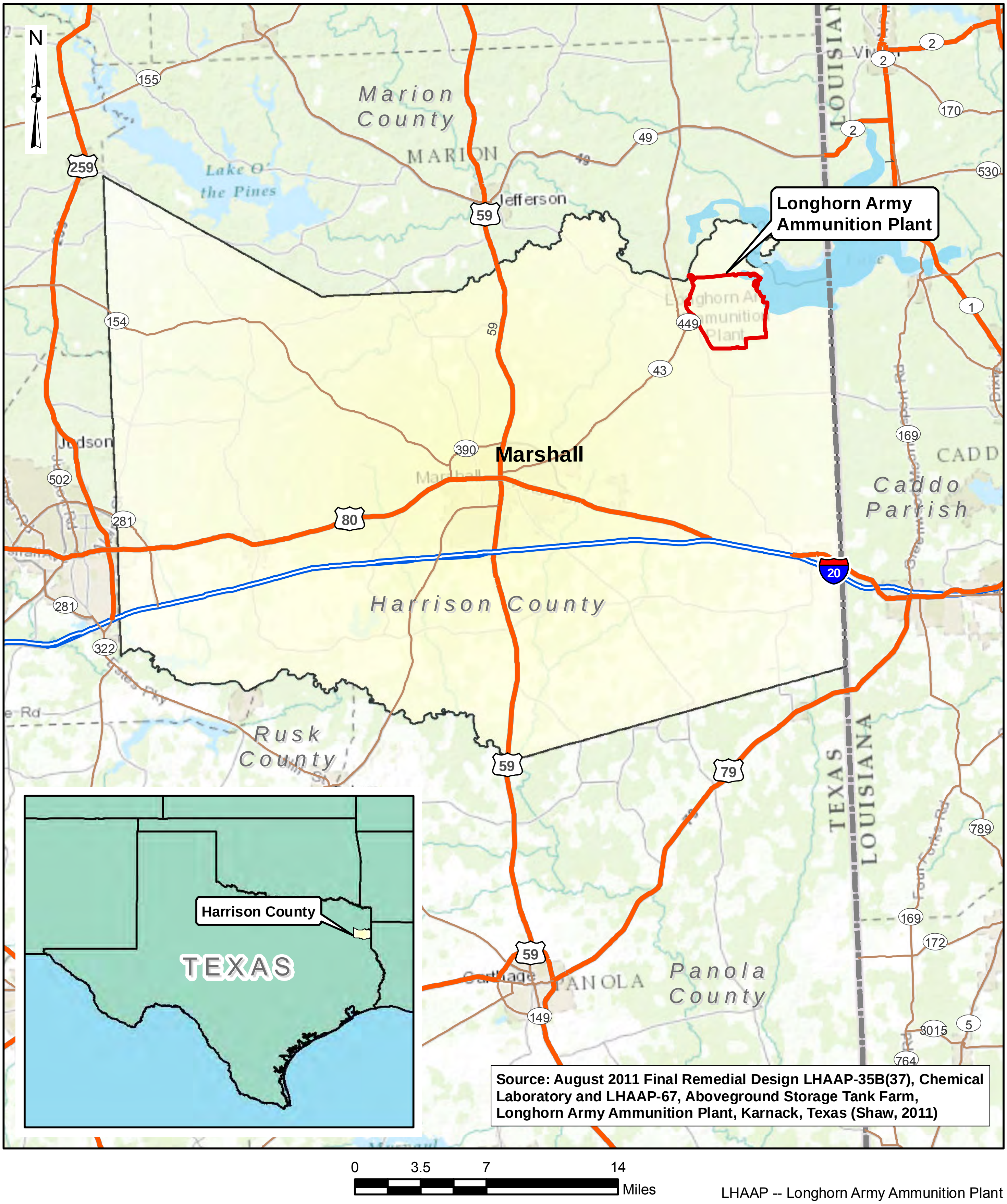

LHAAP -- Longhorn Army Ammunition Plant

AECOM

Figure 1-1
Site Area Map
Remedial Action Work Plan
LHAAP-35B(37)
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

January 2013

\\usgrn1vfp001\data\group\L:\Group\IT_GIS\GIS Projects\Longhorn\MXDs\LHAAP-37\RAWP\2013-Jan-02\Figure 1-1 LHAAP-37 Site Location Map.mxd

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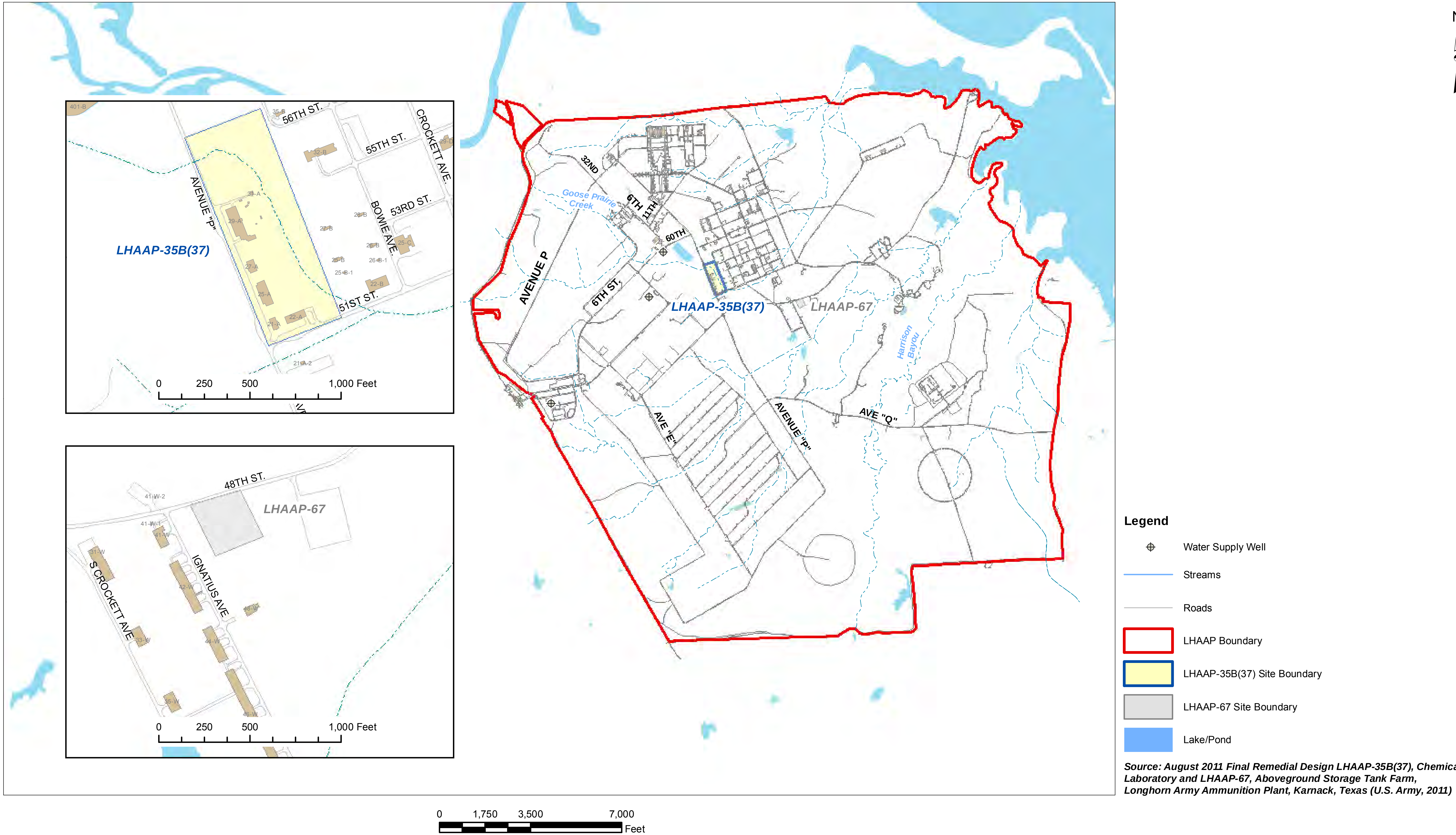

Legend

- Water Supply Well
- Streams
- Roads
- LHAAP Boundary
- LHAAP-35B(37) Site Boundary
- LHAAP-67 Site Boundary
- Lake/Pond

Source: August 2011 Final Remedial Design LHAAP-35B(37), Chemical Laboratory and LHAAP-67, Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant, Karnack, Texas (U.S. Army, 2011)

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Figure 1-2
Site Location Map
Remedial Action Work Plan
LHAAP-35B(37)
Longhorn Army Ammunition Plant
Karnack, Texas

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January 2013

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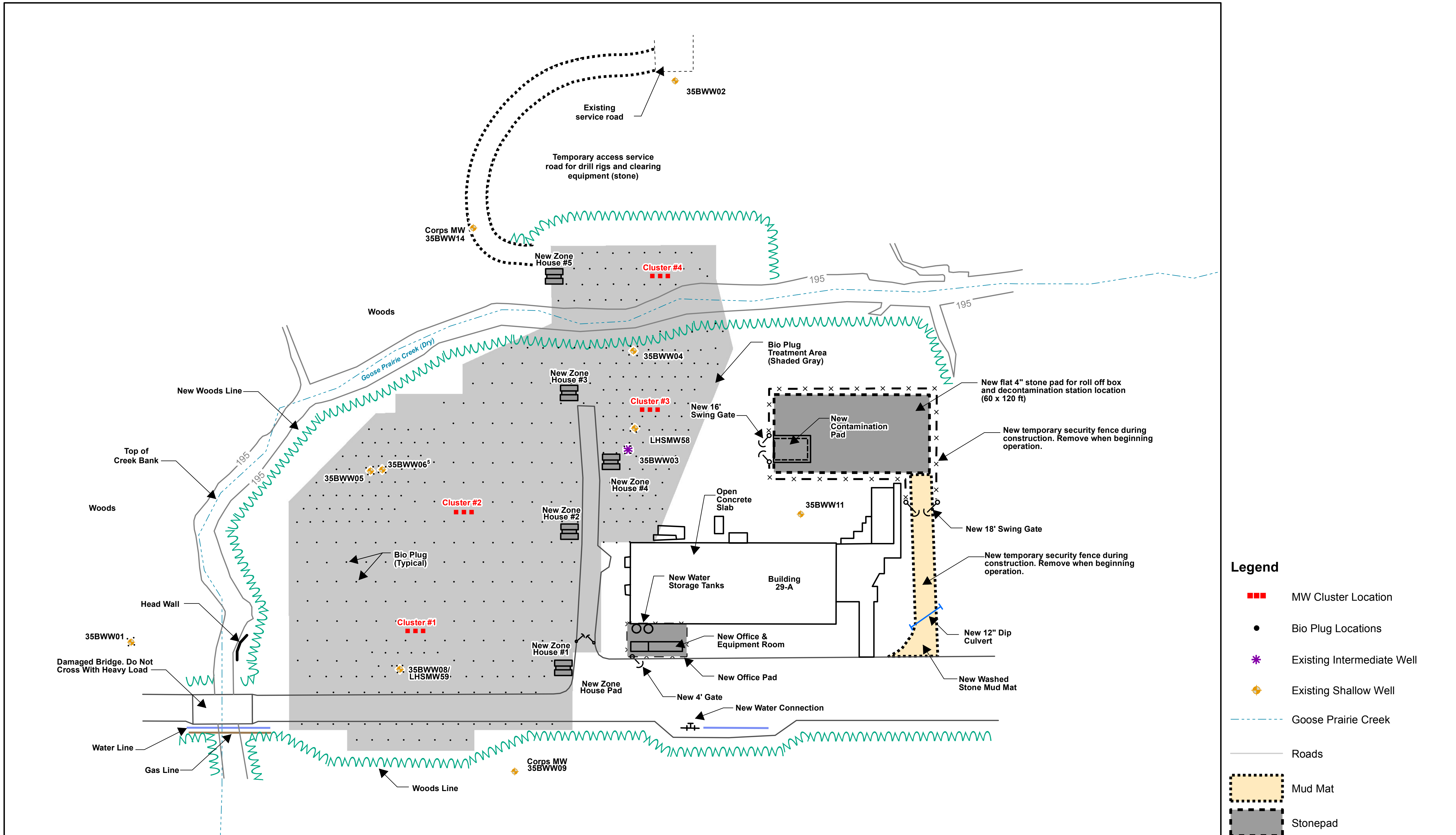

Source: Original map provided by U.S. Army.

0 37.5 75 150 Feet

Notes:
1. Topography performed by: Landmark Consultants, Inc. Professional Land Surveyors, November, 2011.
2. Locations of groundwater monitoring wells to be selected by DOA project representative.
3. ■■■ represents groundwater monitoring well cluster location.
4. Bio Plug Demonstration Study is performed by a separate contractor for the U.S. Army.
5. Well 35BWW06 is a lower shallow well.

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Figure 1-3
Bio-Plug Demonstration Pilot Study
Remedial Action Work Plan
LHAAP-35B(37)
Longhorn Army Ammunition Plant
Karnack, Texas

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April 2013

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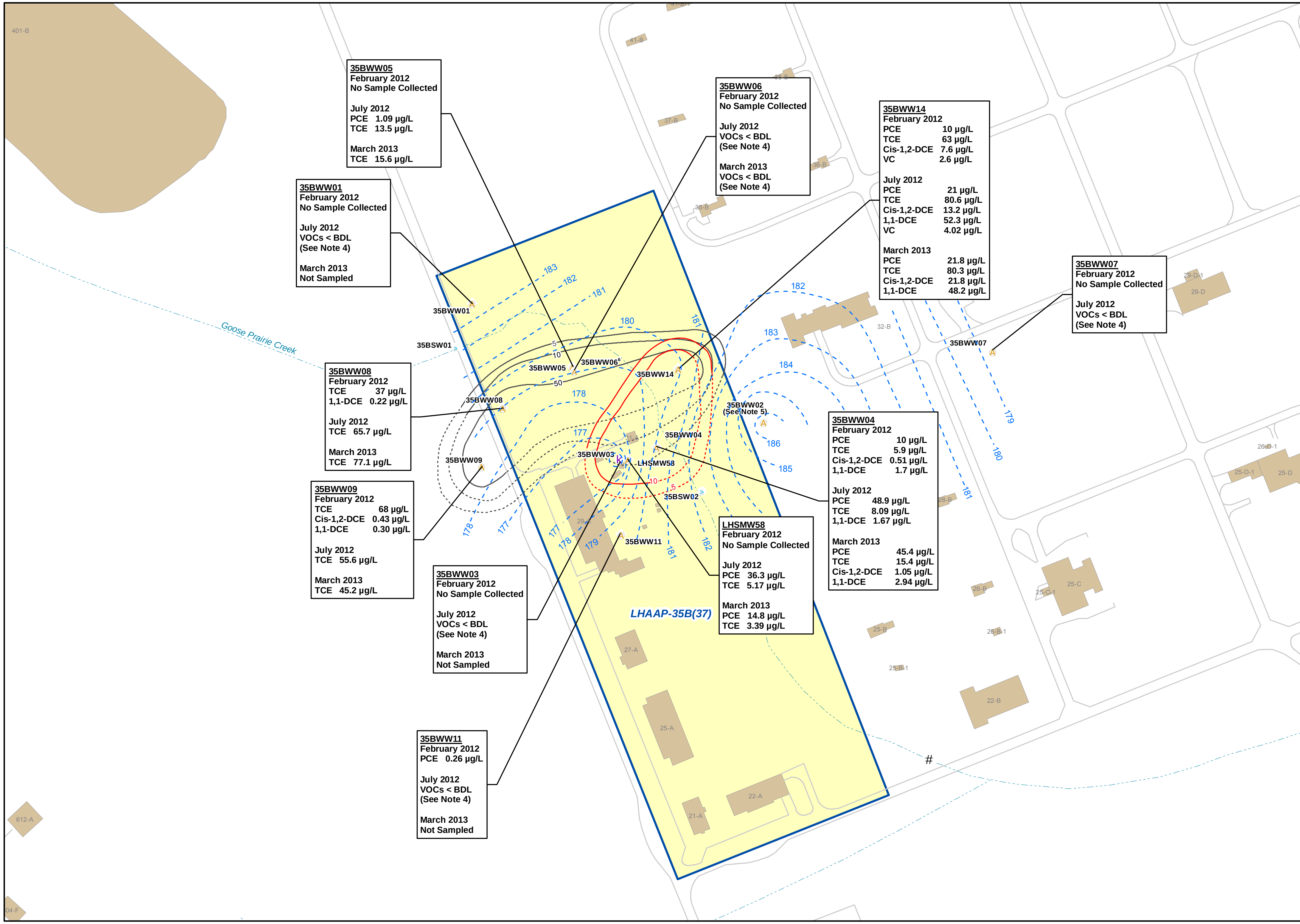
3



July 2012 Sampling Event Gauging Data					
Well ID	Casing Height (Ft) (above ground surface)	Well Depth (Ft) (to top of casing)	Water Level (Ft) (to top of casing)	Surface Elev. (Ft msl)	Groundwater Elev. (Ft msl)
35BWW01	2.1	21.28	18.45	200.17	183.82
35BWW02	2.35	16.85	16.66	200.82	186.51
35BWW03	2.21	82.5	27	200.36	175.57
35BWW04	3.06	33.18	22.84	199.95	180.17
35BWW05	2.67	37.78	23.31	199.95	179.31
35BWW06	3	53.15	23.92	199.98	179.06
35BWW07	2.65	31.2	26.19	202	178.46
35BWW08	2.42	34.08	24.49	201.06	178.99
35BWW09	2.04	37.03	25.65	202.15	178.54
35BWW11	2.44	37.46	23.54	200.74*	179.65
35BWW14	1.75	37.08	22.3	200.23*	179.69
LHS-MW-58	2.77	35.04	24.06	200.14*	178.86

Notes:
Ft msl - feet above mean sea level
* = Surface elevation at this well is based on Google Earth and not on surveyed data.

Legend

- # Creek Survey Location
- Existing Intermediate Well
- Existing Shallow Well
- Surface Water Sampling Location
- PCE Concentration Contour (Dashed Where Inferred)
- TCE Concentration Contour (Dashed Where Inferred)
- Groundwater Elevation Contour (July 2012)
- Goose Prairie Creek
- Roads
- Buildings
- LHAAP-35B(37) Site

Source: August 2011 Final Remedial Design LHAAP-35B(37), Chemical Laboratory and LHAAP-67, Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant, Karnack, Texas (U.S. Army, 2011)

Notes:
1. Concentrations reported in micrograms per liter (µg/L).
2. February 2012, July 2012, and March 2013 sampling events were performed by Cherokee Nation, on behalf of the U.S. Army as part of the bio-plug demonstration study.
3. Concentrations from July 2012 sampling event where available are used to generate concentration contours.
4. VOCs are below laboratory detection limits.
5. Well 35BWW02 was dry in 2004 and 2006. It is not known if the wells with no data were not sampled or if they were dry during sampling event.
6. Well 35BWW06 is a lower shallow well.
8. The groundwater elevation data is from July 2012 sampling event.
9. The surface elevation data at wells 35BWW09, 35BWW11, and 35BWW14 is estimated from Google Earth and is not based on survey information.

0 100 200 400 Feet

TCE - Trichloroethene
PCE - Tetrachloroethene
cis-1,2-DCE - Cis-1,2-Dichloroethene
VC - Vinyl Chloride
1,1-DCE - 1,2-Dichloroethene

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Figure 1-4
Approximate TCE and PCE Plumes in Shallow Groundwater
Remedial Action Work Plan
LHAAP-35B(37)
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

April 2013

2 LAND USE CONTROL PLAN

The U.S. Army or its representatives will be responsible for LUC implementation and certification, reporting and enforcement. The U.S. Army will address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable. The following sections provide a detailed scope of work for the LUC component of the RA.

2.1 Land Use Control Implementation

The objectives of LUC at LHAAP-35B (37) are to prevent human exposure to groundwater contamination presenting an unacceptable risk to a future maintenance worker and ensure that there is no withdrawal or use of groundwater from the site for anything other than environmental monitoring and testing. This groundwater restriction will remain in effect until the levels of the COCs in groundwater allow for unlimited use and unrestricted exposure. Notification of the groundwater use restriction will accompany all transfer documents and will be recorded at the Harrison County Courthouse in accordance with the Texas Administrative Code (TAC) Title 30, §335.566.

The LUC addresses the area of the LHAAP-35B (37) site containing VOC plumes in the shallow groundwater zone. The U.S. Army is responsible for implementing, maintaining, monitoring, reporting on, and enforcing the LUC.

The U.S. Army will undertake the following actions to implement the groundwater restriction LUC for LHAAP-35B (37) site:

- **Define the Area of the Groundwater Use Restriction**

  The estimated LUC boundary is depicted in **Figure 2-1**. The LUC boundary will be finalized after additional data collection as part of plume refinement and MNA evaluation. A buffer may be provided to address uncertainty in the exact location of the plume boundary at all points.

- **Survey the LUC Boundary**

  The proposed LUC boundary will be finalized only after the proposed well installations are complete and all wells are sampled (one round of monitoring data). The proposed boundary will be coordinated with the USEPA and TCEQ, and the LUC boundary will be surveyed by a State-licensed surveyor. A legal description of the surveyed area will be appended to the survey plat. The LUC boundary may be modified if future monitoring data identifies the initial boundary is inaccurate.

- **Record the LUC in Harrison County**

  The LUC plat, legal description and groundwater use restriction language will be recorded in the Harrison County Courthouse in accordance with the TAC Title 30, §335.566.

- **Notify the Texas Department of Licensing and Regulation of the LUC**

  The Texas Department of Licensing and Regulation will be notified of the groundwater restriction which includes the prohibition of water well installation for any purpose other than environmental monitoring and testing without prior approval from the U.S. Army, USEPA, and the TCEQ. The survey plat, legal boundary, and description of the groundwater restriction, in conjunction with a locator map, will be provided in hard and electronic copy.

The U.S. Army and regulators will consult to determine appropriate enforcement actions should there be a failure of a LUC objective at the site after it has been transferred.

2.2 Site Certification and Reporting

The annual inspections/certifications will be completed in compliance with the LUC objectives. The U.S. Army or the transferee after the transfer will retain the annual LUC inspection/certification documents (Appendix B of this document) in the project files for incorporation into the CERCLA five-year review reports, and these reports will be made available to the USEPA and TCEQ upon request. If any violations are found during the annual certification, the U.S. Army will provide the USEPA and TCEQ a separate written explanation indicating the specific violations found and what efforts or measures have or will be taken to correct the violations. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental transfer document. The need to continue annual inspections/certifications will be revisited during CERCLA five-year reviews.

2.3 Notice of Planned Property Conveyances

The U.S. Army will provide notice to the USEPA and TCEQ when conveying the LHAAP-35B (37) site acreage. The notice will describe the mechanism by which the LUC will continue to be implemented, maintained, inspected, reported, and enforced. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the ECP or other environmental transfer document. The U.S. Army retains the responsibility for remedy integrity and is responsible for addressing substantive violations of the LUC performance objective that would undermine the U.S. Army CERCLA remedy. The U.S. Army will be responsible for outlining the transferee's LUC obligations in property transfer documents.

2.4 Opportunity to Review Text of Intended Land Use Control

The U.S. Army will provide copies of the groundwater use restriction notification to the TCEQ and USEPA prior to its recordation in Harrison County, and will produce an ECP or other environmental document prior to transfer of the LHAAP-35B (37) site and provide a draft to the USEPA and TCEQ.

2.5 Notification Should Action(s) which Interfere with Land Use Control Effectiveness be Discovered Subsequent to Conveyance

Should the U.S. Army discover any activity on the property inconsistent with the LUC performance objectives after conveyance of the site, USEPA and TCEQ will be notified within 72 hours. The U.S. Army, in conjunction with the USEPA, TCEQ, and the transferee will correct the problem(s) discovered. This reporting requirement does not preclude the U.S. Army from taking immediate action pursuant to its CERCLA authority to prevent any perceived risks to human health and the environment.

2.6 Land Use Control Enforcement

Should the LUC remedy fail, the U.S. Army will coordinate with the USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. The U.S. Army may notify the local agencies with jurisdiction of any LUC violation(s) by future property owners and will work cooperatively with them to restore owner/user compliance with the LUC. Should circumstances warrant, the U.S. Army can choose to exercise its response authorities under CERCLA.

2.7 Modification or Termination of Land Use Control

The U.S. Army will only make a significant modification to, or terminate the LUC or make a land use change inconsistent with the LUC objective with USEPA and TCEQ concurrence before commencing actions that may impact remedy integrity.

The LUC will remain in effect until such time as the U.S. Army, TCEQ, and USEPA agree that the concentrations of COCs are at levels that allow for unlimited use and unrestricted exposure. When this occurs, the LUC will be terminated consistent with the NCP process for post-ROD changes. If the property has been transferred and a determination by the U.S. Army, TCEQ and USEPA has been made to terminate the LUC, the U.S. Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also provide timely advice to other local stakeholders of the action.

2.8 Comprehensive Land Use Control Management Plan of Land Use Control

Upon finalization of this LUC RA, the amended LUC boundary map and legal description recordation will be inserted into the Comprehensive LUC Management Plan for LHAAP. The Comprehensive LUC Management Plan figure and table will be updated to reflect the inclusion of LHAAP-35B (37).

The Comprehensive LUC Management Plan consists of LHAAP RD documents and a survey plat showing the locations where the LUC being implemented at LHAAP is applied. The purpose of this Comprehensive LUC Management Plan is to ensure all site-specific LUC are compiled into one comprehensive document for both pre-transfer use by the installation and for post-transfer use by the transferee. This document will also be accessible to regulators, the local government, and the public. The Comprehensive LUC Management Plan is located in the Marshall Public Library to accompany LHAAP's Administrative Record. As LUC RD documents for additional environmental sites are approved by USEPA and TCEQ, the U.S. Army shall likewise add those documents and survey plats to the Comprehensive LUC Management Plan as well as update the previous copy of the plan placed in the Marshall Public Library.

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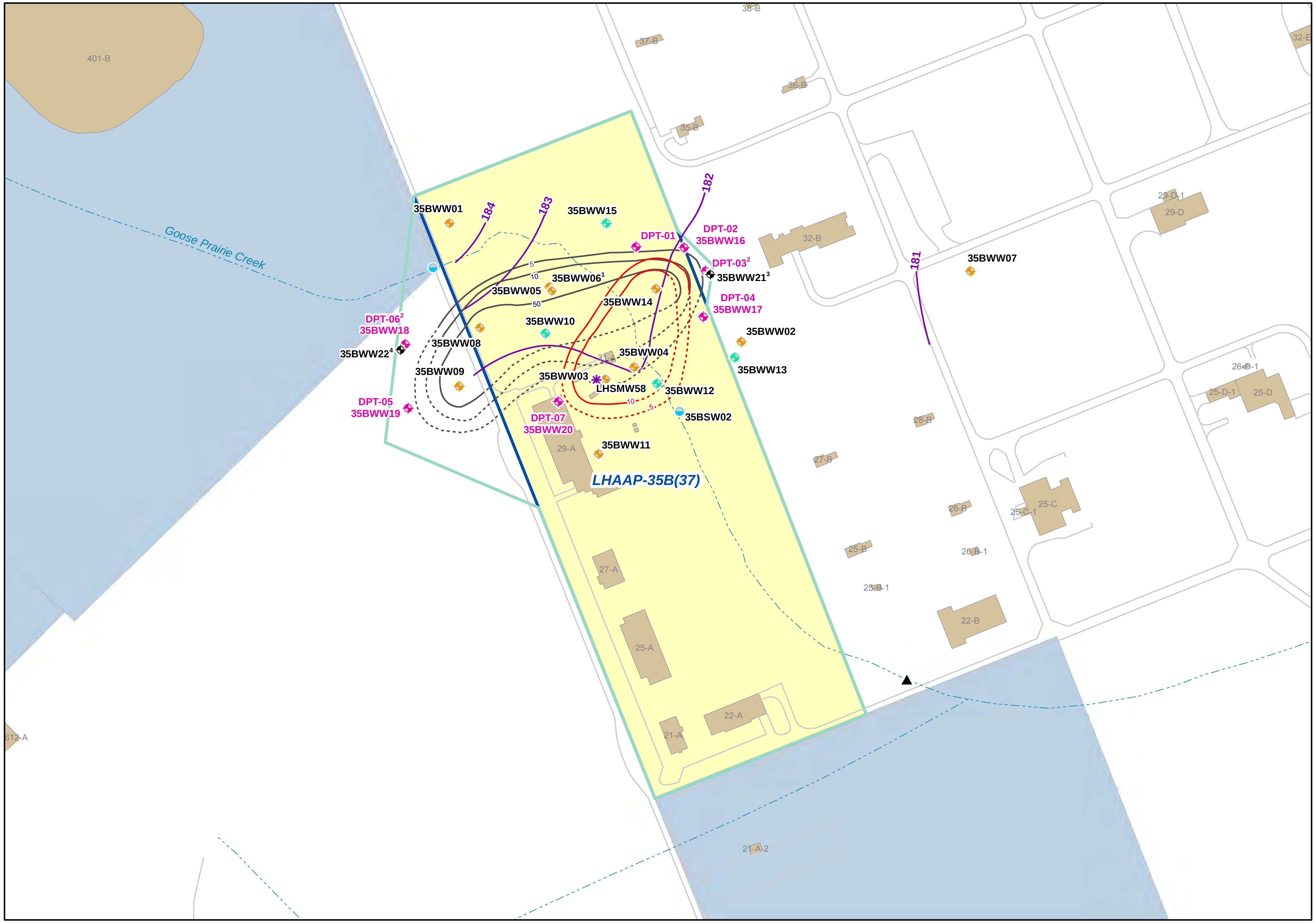

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Legend

- Creek Survey Location
- Proposed Intermediate Zone Well
- Proposed DPT Locations/Shallow Wells
- Existing Intermediate Well
- Existing Shallow Well
- Proposed Shallow Well
- Surface Water Sampling Location (Proposed)
- Groundwater Elevation Contour December 2007
- PCE Concentration Contour (Dashed Where Inferred)
- TCE Concentration Contour (Dashed Where Inferred)
- Goose Prairie Creek
- Roads
- Buildings
- LHAAP-35B(37) LUC Boundary
- LHAAP-35B(37) Site

Source: August 2011 Final Remedial Design LHAAP-35B(37), Chemical Laboratory and LHAAP-67, Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant, Karnack, Texas (U.S. Army, 2011)

FWS Interest

- Acquired Wildlife Refuge

Source: US Fish and Wildlife Service (FWS) National Wilife Refuge System - December 2012

0 100 200 400 Feet

Notes:
1. Well 35BWW06 is a lower shallow well.
2. DPT-03 and DPT-06 will be advanced into the intermediate zone and if groundwater is encountered, a sample will be collected for analysis of VOCs.
3. Intermediate zone well 35BWW21 will be installed only if groundwater sample could be collected from the intermediate zone DPT-03 point and the VOC analysis of the collected sample depicts COCs exceeding cleanup levels.
4. Intermediate zone well 35BWW22 will be installed only if groundwater sample could be collected from the intermediate zone DPT-06 point and the VOC analysis of the collected sample depicts COCs exceeding cleanup levels.

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Figure 2-1
Location of Monitoring Wells and Proposed LUC Boundaries
Remedial Action Work Plan
LHAAP-35B(37)
Longhorn Army Ammunition Plant
Karnack, Texas

60256135

April 2013

3 MONITORED NATURAL ATTENUATION

This section discusses the objectives and details of the MNA program under the RA.

COCs are present in the upper shallow groundwater zone at the LHAAP-35B (37) site. No constituents have exceeded their cleanup levels in the intermediate groundwater zone; hence, this zone will not be monitored. The nature and extent of groundwater contamination in the shallow groundwater zone is discussed in section 1.2.2.

Performance monitoring will be conducted to evaluate remedy effectiveness and will include groundwater and surface water monitoring. The groundwater monitoring program is designed to evaluate and monitor natural attenuation of COCs in shallow zone groundwater and the surface water monitoring program is designed to evaluate potential migration of contaminated groundwater to surface water.

The combined monitoring program shall meet the following objectives (USEPA, 1999):

- Demonstrate that natural attenuation is effectively occurring;
- Detect changes in environmental conditions (e.g. geochemical, hydrogeologic, etc.) that may reduce the efficacy of any of the natural attenuation processes;
- Identify potentially toxic and/or mobile transformation products;
- Verify that the plume(s) is not expanding;
- Verify no unacceptable impact to downgradient receptors;
- Detect new releases of contaminants to the environment that could impact effectiveness of the natural attenuation remedy; and,
- Verify attainment of the remediation objectives.

3.1 Plume Refinement Activities

TCE was detected at concentrations exceeding its MCL in wells 35BWW04 (5.9 µg/L), 35BWW08 (37 µg/L), 35BWW09 (68 µg/L), and 35BWW14 (63 µg/L) in February 2012. PCE exceeded its MCL in wells 35BWW04 (17 µg/L), and 35BWW14 (10 µg/L). In addition, VC exceeded its MCL in well 35BWW14 (2.6 µg/L) in February 2012.

In July 2012, TCE exceeded its MCL in wells 35BWW04 (8.09 µg/L), 35BWW05 (13.5 µg/L), 35BWW08 (65.7 µg/L), 35BWW09 (55.6 µg/L), 35BWW14 (80.6 µg/L), and LHSMW58 (5.17 µg/L). PCE exceeded its MCL in wells 35BWW04 (48.9 µg/L), 35BWW14 (21 µg/L) and LHSMW58 (36.3 µg/L) in July 2012 event. 1,1-DCE exceeded its MCL in well 35BWW14 (52.3 µg/L) in July 2012. VC exceeded its MCL in well 35BWW14 (4.02 µg/L) in February 2012.

In March 2013, TCE exceeded its MCL in wells 35BWW04 (15.4 µg/L), 35BWW05 (15.6 µg/L), 35BWW08 (77.1 µg/L), 35BWW09 (45.2 µg/L), and 35BWW14 (80.3 µg/L). PCE exceeded its MCL in wells 35BWW04 (45.4 µg/L), 35BWW14 (21.8 µg/L) and LHSMW58 (14.8 µg/L). 1,1-DCE exceeded its MCL in well 35BWW14 (48.2 µg/L) in March 2013.

Data from July 2012 and March 2013 is included in Appendix C.

Additional monitoring wells are proposed at the LHAAP-35B (37) site to provide additional data for TCE/PCE plume refinement and to assist in evaluation of natural attenuation.

Prior to installation of permanent monitoring wells, discrete groundwater samples will be collected from a minimum of seven temporary borings advanced using direct push technology (DPT) drilling and will be analyzed for VOCs. Approximate locations of the seven temporary borings, DPT-01 through DPT-07 are depicted in **Figure 3-1**. Additionally, two of the borings, DPT-03 and DPT-06, will be advanced into the intermediate zone of the aquifer. Discrete groundwater samples, if groundwater is present, will be collected from the intermediate zone from these two borings and will be analyzed for VOCs.

After collecting VOC data from the temporary borings, permanent shallow monitoring wells will be installed at nine different locations. Proposed locations of the shallow monitoring wells, 35BWW10, 35BWW12, 35BWW13, 35BWW15, 35BWW16, 35BWW17, 35BWW18, 35BWW19, and 35BWW20 are depicted in **Figure 3-1**. Additional DPT points will be installed, if necessary, to the southwest of DPT-07 if results from DPT-07 detect VOCs above applicable standards. The location of the proposed monitoring well 35BWW20 will be adjusted in the field based on VOC results from DPT-07 and if necessary the additional DPT point. Additionally, if the discrete groundwater samples collected from intermediate zone from DPT-03 and DPT-06 indicate VOC data above their respective cleanup levels, permanent groundwater wells 35BWW21 and 35BWW22 will be installed in the intermediate zone near the locations of DPT-03 and DPT-06, respectively. If VOCs in groundwater from these two DPTs are below cleanup levels, no intermediate zone wells will be installed.

Table 3-1 provides the rationale for proposed DPT points and the shallow and intermediate zone monitoring well locations. The exact locations will be adjusted in the field based on site conditions and available data. The additional data, along with sampling and analysis of existing wells, will be used as guidance to optimize placement of proposed new monitoring wells.

The information gathered from the well installations and one round of monitoring data will be used to establish LUC boundaries for the site. As discussed above, the bio-plug study will be ongoing through approximately February 2014, which includes monitoring at site wells. Implementation of groundwater monitoring presented in this workplan will begin following completion of the bio-plug study and related monitoring.

In summary, a minimum of nine additional shallow monitoring wells (and potentially two intermediate zone wells) are proposed at LHAAP-35B (37) site. **Figure 3-1** depicts the approximate expected locations of the proposed monitoring wells, which are subject to change based upon the findings of the discrete groundwater sampling effort. The use of existing wells will be maximized as they provide historic data that can be used for MNA evaluation.

3.2 MNA Implementation

This section describes the field and other activities planned at the LHAAP-35B (37) site that relate to the MNA component of the groundwater remedy. General activities would apply to any site with similar characteristics. Site-specific activities are described in associated subsections.

3.2.1 Pre-mobilization Activities

A pre-construction meeting will be held prior to initiation of field activities.

3.2.2 Preliminary Activities/Mobilization

The field schedule will be finalized with the selected drilling contractor prior to mobilization to the LHAAP-35B (37) site. An on-site project kickoff meeting will be held with the contractor to review the scope of work including the drilling locations, utility clearances, and health and safety issues.

3.2.3 Site/Utility Clearance

The locations of subsurface utilities will be evaluated based on existing utility maps. All proposed borehole locations will be marked, Underground Service Alert (One Call) will be notified at least two working days prior to intrusive work, and the utility clearance standard operating procedure will be followed.

3.2.4 Direct Push Groundwater Sampling

DPT will be used to collect discrete groundwater samples to refine the boundaries of the shallow groundwater zone plume in order to accurately implement the remedy. A minimum of seven shallow DPT well points will be installed to collect discrete groundwater samples. In addition, two of the DPTs (DPT-03 and DPT-06) will be advanced into the intermediate zone and discrete groundwater samples collected from the intermediate zone. Discrete groundwater samples will be collected from DPT points using a Geoprobe SP-15® or equivalent which has a 3.5-foot screen length. The drilling equipment will be decontaminated after each sample is collected to prevent cross-contamination.

The collected groundwater samples will be analyzed for VOCs utilizing USEPA Method 8260B. Sample analyses and analytical results validation will be conducted in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

3.2.5 Monitoring Well Installation

A minimum of nine new monitoring wells (**Figure 3-1**) are proposed in the shallow groundwater zone. Additionally, a maximum of two monitoring wells may be installed in the intermediate groundwater zone. Monitoring wells will be installed using a hollow-stem auger, mud rotary or sonic drilling techniques as appropriate. Well installation and development will follow the procedures specified in the Installation-Wide Work Plan in place at the time field work is conducted.

3.2.6 Site Survey

After completion of the sampling activities, the monitoring wells 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.

3.2.7 MNA Program Groundwater Monitoring

As discussed in Section 1.2.2, the bio-plug study will be ongoing through approximately February 2014, which includes monitoring at site wells. Implementation of groundwater monitoring presented in this workplan will begin following completion of the bio-plug study and related monitoring.

Groundwater monitoring will be performed to demonstrate effectiveness of the MNA remedy. Up to 19 shallow zone monitoring wells (**Figure 3-1**) are proposed to be included in the monitoring program for VOCs. These wells have been selected for their placement relative to the VOC plumes to monitor effectiveness of natural attenuation at the LHAAP-35B (37) site as well as to verify the plume extent and the validity of the LUC boundaries. The number of monitoring wells included in the network may be reduced based on results of the initial groundwater data collection activities. In addition, the existing intermediate zone well (35BWW03), the existing lower shallow well (35BWW06), and the two new proposed intermediate zone wells (35BWW21 and 35BWW22), if installed, will be analyzed for VOCs during the baseline event Subsequent monitoring of these four wells (35BWW03, 35BWW06, 35BWW21 and 35BWW22) will be performed once every five years to support the Five-year review. Table 3-2 indicates the wells and the analytes for each well. Table 3-3 lists the analytes, test methods, and other sampling information. Well 35BWW02 has previously been observed dry during the 2004 and 2006 sampling events. If any particular well is dry, no sample will be collected.

Prior to sampling, depth to groundwater measurements will be recorded using an interface probe capable of detecting the presence of free phase (either light or dense non-aqueous phase) hydrocarbons. The depth to water will be measured from a specified location on top of the casing where elevation has been determined. The depth to water will be recorded in the appropriate field forms and the water elevation calculated using the top of casing elevation. These results will be used to construct a potentiometric map for the site.

Prior to sampling groundwater, each well will be purged and general water quality parameters (temperature, pH, specific conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity) will be collected. Upon completion of these activities, groundwater samples will be collected and placed into laboratory-provided containers. The containerized samples will be properly labeled, placed within ice-filled coolers, and shipped to the laboratory under chain-of-custody control for analytical testing. All well purging, groundwater sampling, sample labeling and shipping activities will be conducted in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

The schedule for groundwater monitoring for MNA will be quarterly for two years, which will be initiated following completion of the bio-plug study. Samples from a subset of the monitoring wells (35BWW01, 35BWW04, 35BWW08, 35BWW12, 35BWW14, and LHSMW58) will also be tested for the following biogeochemical parameters: nitrate, nitrite, sulfate, ferrous iron, chloride, methane, ethane, ethene, inorganic and organic carbon, and Dehalococcoides ethenogenes (DHC).

Sample analyses and analytical results validation will be conducted in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

3.2.7.1 Surface Water Sampling

Surface water samples from two locations (35BSW01 and 35BSW02) in the Goose Prairie Creek (one upgradient and other downgradient of LHAAP-35B (37) site) will be collected on a quarterly basis for the first year and then annually until the next CERCLA five-year review to confirm contaminated groundwater is not migrating into the surface water and the start of surface water sampling will coincide with the start of well sampling. **Figure 3-1** depicts the proposed locations to collect surface water samples. The collected surface water samples will be analyzed for VOCs. Surface water sampling, sample labeling and shipping activities will be conducted in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

3.2.7.2 Long-term Monitoring

After the first two years of quarterly groundwater monitoring, which will commence following completion of the bio-plug study, the long-term monitoring frequency will be reduced to semiannual for three additional years, then annually until the next CERCLA five-year review. After the first year of quarterly monitoring, the suite of analyses performed will also be limited to VOC analysis to be used for ongoing confirmation of declining concentration trends. Further reductions in sampling frequency will depend upon results of CERCLA five-year reviews, but sampling will continue at least once every five years until cleanup levels are attained.

3.2.8 Antimony and Thallium Monitoring

Antimony and thallium were detected in groundwater at the LHAAP-35B (37) site prior to the Remedial Investigation conducted in 2002. Antimony and thallium were not included as COCs due to follow-on groundwater samples being non-detect for these metals, their non-detection in soils at the site, and the lack of their historical uses at the site. No subsequent sampling was conducted at the site for antimony and thallium after 2002.

Groundwater samples from the shallow zone wells collected during the first monitoring event will be analyzed for antimony and thallium to confirm the previous decision to exclude these constituents as COCs. After the first sampling and analysis event for antimony and thallium at LHAAP-35B (37), the need for additional monitoring for these constituents will be evaluated.

Sample collection, analyses and analytical results validation will be conducted in accordance with the Installation-Wide Work Plan in place at the time field work is conducted.

3.2.9 Investigation Derived Wastes

Investigation-Derived Waste (IDW) generated during the investigation and monitoring activities will include disposable sampling equipment, purge water, equipment decontamination fluids, and personal protection equipment (PPE). IDW (except PPE and disposable sampling equipment) will be containerized and stored on-site 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.

3.2.10 Decontamination of Equipment and Personnel

Decontamination of equipment and personnel will be performed as discussed in the Installation-Wide Work Plan in place at the time field work is conducted.

3.3 Health and Safety Procedures

AECOM and its subcontractors will comply with the health and safety procedures specified by the Installation-Wide Work Plan in place when field work is performed. AECOM anticipates field work will be performed in modified Level D 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 will be included in the Installation-Wide HASP.

3.4 Quality Assurance/Quality Control

All work will be done in accordance with the Installation-Wide Work Plan in place when field work is conducted. The Installation-Wide Work Plan provides information on quality assurance/quality control (QA/QC) procedures for this project, identifies personnel, procedures, controls, instructions, tests, verifications, documents, and forms to be used and the types of records to be maintained. The Installation-Wide Work Plan also addresses quality control requirements specific to each major feature of work.

Table 3-1: Rationale for Selection of Proposed DPT Points and Monitoring Well Locations in Shallow Groundwater Zone

Proposed DPT/Well ID	Location relative to the Plume	Rationale/Purpose
DPT-01	Northwest of well 35BWW14	For delineation of TCE plume near well 35BWW14
DPT-02	North of well 35BWW14	For delineation of TCE plume near well 35BWW14.
DPT-03*	Northeast of well 35BWW14	For delineation of TCE plume near well 35BWW14. To collect a discrete groundwater sample from the intermediate zone in this location for analysis of VOCs.
DPT-04	Down gradient of well 35BWW14	For delineation of TCE plume down gradient of well 35BWW14.
DPT-05	Vicinity of well 35BWW09	For delineation of TCE plume west of well 35BWW09; confirmation of LUC boundary.
DPT-06*	Up gradient and in the vicinity of well 35BWW08	For plume delineation and confirmation of LUC boundary. To collect a discrete groundwater sample from the intermediate zone in this location for analysis of VOCs.
DPT-07	Southwest of well LHSMW58	For plume delineation near well LHSMW58 and 35BWW09
Well 35BWW10	Within plume, down gradient of well 35BWW08	MNA evaluation; Long-term monitoring
Well 35BWW12	Down gradient of well 35BWW04	MNA evaluation; Long-term monitoring
Well 35BWW13	Down gradient of well 35BWW04	MNA evaluation; Long-term monitoring
Well 35BWW15	Up gradient and northwest of well 35BWW14	MNA evaluation; Long-term monitoring
Well 35BWW16	Vicinity of DPT-02 and north of well 35BWW14	Refine northeastern plume edge; MNA evaluation; Long-term monitoring
Well 35BWW17	Vicinity of DPT-04 and down gradient of well 35BWW14	MNA evaluation; Long-term monitoring
Well 35BWW18	Vicinity of DPT-06 and up gradient of well 35BWW08	Refine western edge of plume; MNA evaluation; Long-term monitoring
Well 35BWW19	Vicinity of DPT-05 and west of well 35BWW09	Refine western edge of plume; MNA evaluation; Long-term monitoring
Well 35BWW20	Vicinity of DPT-07 and southwest of LHSMW58	Refine plume edge; MNA evaluation; Long-term monitoring
Well 35BWW21**	Vicinity of DPT-03	For confirmation of presence of VOCs in groundwater in the intermediate zone
Well 35BWW22**	Vicinity of DPT-06	For confirmation of presence of VOCs in groundwater in the intermediate zone

Note: Locations of the proposed new monitoring wells will be adjusted as necessary based on the results of the VOC screening from DPT points. Additional DPT points will be installed in the shallow zone if the current DPT points that are being used for confirmation of the LUC boundary detect VOCs above applicable standards.

* - This boring will be advanced into the intermediate zone to collect a discrete groundwater sample, if available, from the intermediate zone, for analysis of VOCs.

** - Wells 35BWW21 and 35BWW22 will be installed in the intermediate zone only if groundwater samples collected from DPT-03 and DPT-06 detect VOCs at concentrations greater than their respective cleanup levels.

Table 3-2: Monitored Natural Attenuation (MNA) Performance Monitoring Wells

Monitoring Well(1) ID	VOCs	Field Parameters**	MNA Parameters***
35BWW01	X	X	X
35BWW02(2)	X	X	
35BWW03****	X	X	
35BWW04	X	X	X
35BWW05	X	X	
35BWW06****	X	X	
35BWW07	X	X	
35BWW08	X	X	X
35BWW09	X	X	
*35BWW10	X	X	
35BWW11	X	X	
*35BWW12	X	X	X
*35BWW13	X	X	
35BWW14	X	X	X
*35BWW15	X	X	
*35BWW16	X	X	
LHSMW58	X	X	X
*35BWW17	X	X	
*35BWW18	X	X	
*35BWW19	X	X	
*35BWW20	X	X	
35BWW21*****	X	X	
35BWW22*****	X	X	

Notes:

(1) The number of monitoring wells included in the network and the sampling frequency may be adjusted based on results of the initial data collection activities.

(2) Well 35BWW02 has been dry previously during the 2004 and 2006 sampling events. If any well is dry, no sample will be collected.

* - Proposed monitoring wells (shallow zone)

** - Field parameters to be monitored for all wells: pH, temperature, conductivity, turbidity, ORP, DO

*** - MNA parameters include nitrate, nitrite, sulfate, ferrous iron, chloride, methane, ethane, ethene, inorganic and organic carbon, DHC. Additional parameters may be added or existing set of MNA parameters may be modified as needed as data from initial monitoring events is evaluated.

**** - Wells 35BWW03 is completed in the intermediate zone and well 35BWW06 is completed in the lower shallow zone. These two wells will be sampled during the baseline event and then once every five years to support the Five-year review.

***** - Wells 35BWW21 and 35BWW22 will be installed and completed in the intermediate zone only if groundwater samples are collected from DPT-03 and DPT-06 and the VOC data from these samples indicate concentrations exceeding cleanup levels.

These wells, if installed, will be sampled during the baseline event and then once every five years to support the Five-year review.

X - Well will be analyzed for that parameter.

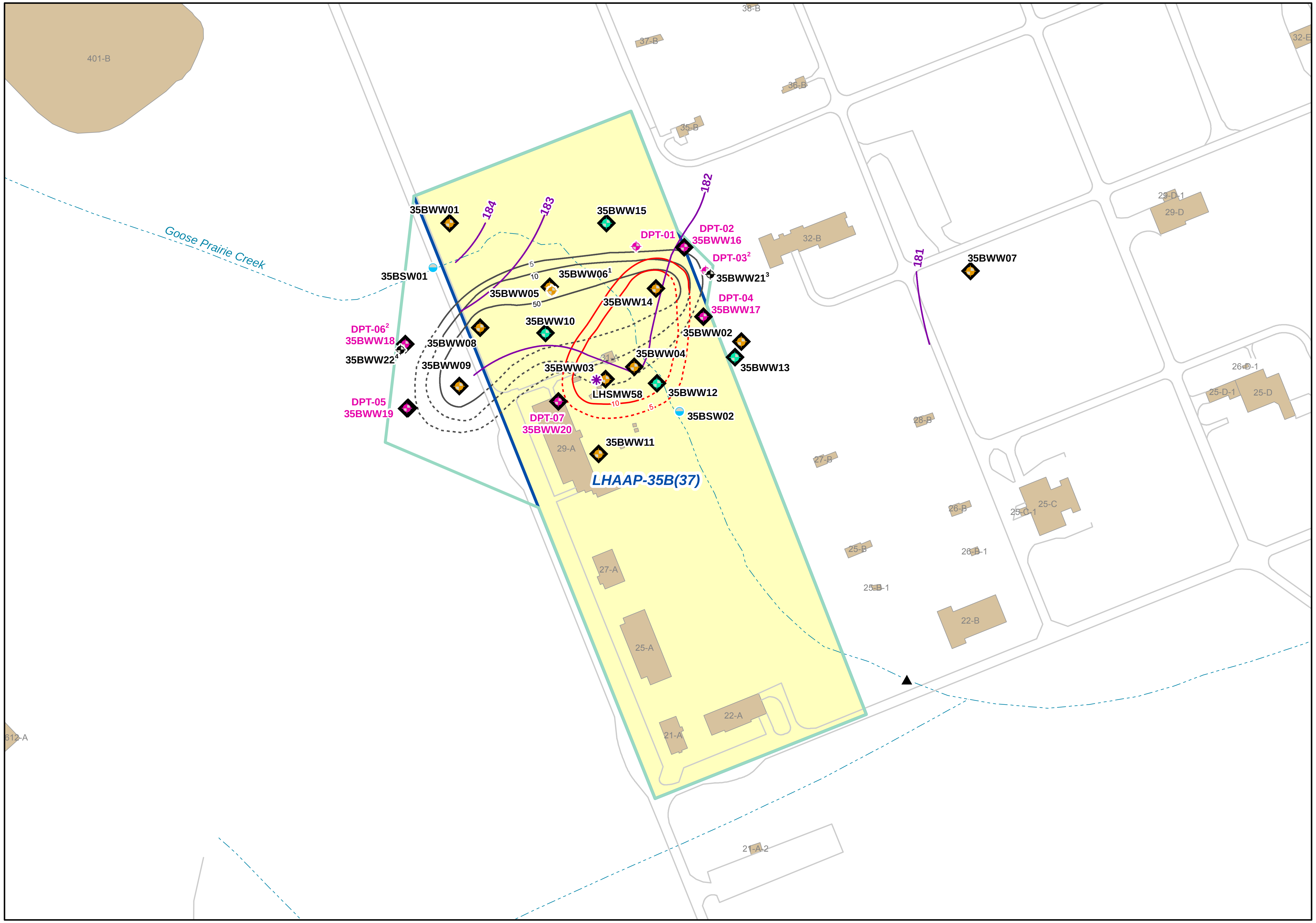
MNA - monitored natural attenuation

VOCs - volatile organic compounds.

Table 3-3: Analytical Methods, Containers, and Preservatives

Parameter	Minimum Sample Volume	Holding Time	Preservation	Method
Volatiles	3x40 mL glass vial with PTFE septa cap	14 days	pH < 2 HCl, Cool at 4°C, no headspace	8260B (or latest method)
Thallium	1x250 mL polyethylene bottle	180 days	pH < 2 HNO_3, Cool at 4°C	SW846 3005A/6010C/6020A/7470A/ ME401/ME404/ME600E/ME600G/ME700A
Antimony	1x250 mL polyethylene bottle	180 days	pH < 2 HNO_3, Cool at 4°C	SW846 3005A/6010C/6020A/7470A/ ME401/ME404/ME600E/ME600G/ME700A
DHC	2x1 L amber glass bottles with teflon-lined cap(s)	14 days	Cool at 4°C	Polymerase Chain Reaction (PCR)
Common Anions (chloride, sulfate)	250 mL polyethylene bottle	28 days (Cl/SO_4)	Cool at 4°C	USEPA 300.0
Nitrate/nitrite as N	500 mL polyethylene bottle	28 days	pH < 2 H_2SO_4, Cool at 4°C	USEPA 353.2
Total organic carbon (TOC)	3x40 mL Amber Glass Vials	28 days	pH < 2 H_2SO_4 or HCL, Cool at 4°C	USEPA 415.1
Dissolved gases (methane, ethane, ethene)	3x40 mL glass vial with PTFE septa cap	14 days	Cool at 4°C	RSK 175
Ferrous iron	NA	Immediately in field (with a field kit)	NA	NA

Notes and Abbreviations:
The above listed volumes provide an adequate quantity of samples to analyze a matrix spike (MS) and matrix spike duplication (MSD)
°C – degrees centigrade
H_2SO_4 – sulfuric acid
HCL – hydrochloric acid
HNO_3 – nitric acid
L – liter
mL – milliliter
PTFE – polytetrafluoroethylene
NA – Not applicable
USEPA – United States Environmental Protection Agency



0 100 200 400
Feet

Legend

- ▲ Creek Survey Location
- Proposed Intermediate Zone Well
- Proposed DPT Points and New Shallow Monitoring Well Locations
- Existing Intermediate Well
- Existing Shallow Well
- Proposed Shallow Well
- Surface Water Sampling Location (Proposed)
- Wells in the MNA Monitoring Program
- Groundwater Elevation Contour December 2007
- PCE Concentration Contour (Dashed Where Inferred)
- TCE Concentration Contour (Dashed Where Inferred)
- Goose Prairie Creek
- Roads
- Buildings
- LHAAP-35B(37) LUC Boundary
- LHAAP-35B(37) Site

DPT - Direct Push Technology
TCE - Trichlorothene
PCE - Tetrachloroethene

Source: August 2011 Final Remedial Design LHAAP-35B(37), Chemical Laboratory and LHAAP-67, Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant, Karnack, Texas (U.S. Army, 2011)

Notes:
1. Well 35BWW06 is a lower shallow well.
2. DPT-03 and DPT-06 will be advanced into the intermediate zone and if groundwater is encountered, a sample will be collected for analysis of VOCs.
3. Intermediate zone well 35BWW21 will be installed only if groundwater sample could be collected from the intermediate zone DPT-03 point and the VOC analysis of the collected sample depicts COCs exceeding cleanup levels.
4. Intermediate zone well 35BWW22 will be installed only if groundwater sample could be collected from the intermediate zone DPT-06 point and the VOC analysis of the collected sample depicts COCs exceeding cleanup levels.

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Figure 3-1
Proposed DPT Points and New Monitoring Well Locations
Remedial Action Work Plan
LHAAP-35B(37)
Longhorn Army Ammunition Plant
Karnack, Texas

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4 REMEDY PERFORMANCE EVALUATION AND REPORTING

Reporting will consist of formal annual reports, supplemented by the sharing of validated data as it becomes available to shorten the time between sampling and data receipt by the regulators. Annual reports will be prepared for any year in which sampling occurs to document the monitoring program, which will begin following completion of the bio-plug study. The groundwater monitoring will be terminated after the remedy has achieved cleanup levels. The CERCLA five-year reviews will be conducted and reports prepared until levels allowing for unlimited use and unrestricted exposure are achieved. The TCEQ guidance document, 'Monitored Natural Attenuation Demonstrations under TRRP' (TCEQ, RG-366/TRRP-33, revised September 2010) will be used as guideline for evaluation of groundwater data.

4.1 MNA Evaluation

The first year's annual report will include a review of the first four quarters of data, which include natural attenuation parameters and relevant historical data and provide an evaluation for the evidence of MNA as a remedial method and a review of the first year's surface water sample data. The MNA performance criteria are listed in **Table 4-1**. The first annual report will include:

- Figures of the site, wells, and groundwater elevation contours;
- Groundwater and surface water results;
- Plume extent and concentration over time;
- Consideration of the first and second lines of evidence for MNA (see sections 4.1.2 through 4.1.3); and
- An evaluation of the effectiveness of MNA at the site.

For the subsequent annual reports, the data evaluation presented will focus on trend analysis for the COCs.

4.1.1 Migration/Expansion

The MNA evaluation should demonstrate a stable or decreasing plume if the MNA remedy is to be considered favorable at the LHAAP-35B (37) site. A groundwater plume is stable when the pollutant concentrations and plume footprint are relatively unchanged over time. A stable plume shows that pollutant migration in groundwater is under control.

A plume is considered decreasing if its footprint is diminishing. A decreasing plume situation occurs when the attenuation rate of dissolved-phase pollutants exceeds their generation rate from all sources. A decreasing plume supports natural attenuation as a viable remedial alternative.

Monitoring must occur over a period of time sufficient to demonstrate plume stability or decrease under natural conditions. This may take up to several years depending on site-specific conditions, including the monitoring data trend analysis, potential threats to beneficial uses, and other uncertainties. The non-parametric Mann-Kendall statistic will be used to evaluate solute plume stability. If monitoring data do not indicate plume stability/decrease, the remedy will be re-evaluated.

Table 4-1: Monitored Natural Attenuation (MNA) Evaluation Performance Criteria

Performance Criteria	Type	Expected Performance	Commentary
Migration/Expansion	Qualitative	Stable or decreasing plume footprint, stable footprint position	An expanding or migrating plume footprint indicates MNA should not be continued.
Concentrations	Quantitative	Declining concentrations or total CVOC mass in a majority of performance monitoring wells	First Line of Evidence
Aquifer Conditions	Quantitative	Conditions favorable for natural attenuation	Second Line of Evidence
Microcosm Studies or Modeling (if necessary)	Quantitative	Detectable presence of appropriate microorganisms	Third Line of Evidence (if necessary)

4.1.2 First Line of Evidence

The first line of evidence relies upon comparison of current and historical groundwater data from appropriate monitoring or sampling points that demonstrates a trend of stable or decreasing contaminant mass and/or COC concentrations over time or with distance traveled from the source. Decreasing concentrations should not be solely the result of plume migration, so performance wells will be evaluated to determine if the plume is migrating.

COC concentrations in individual wells can be evaluated to calculate a time-based attenuation rate or across multiple wells through the centerline of a plume to calculate distance-based attenuation rate. These calculations will be performed using the methods contained in the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998).

Time-based attenuation rates will be calculated for any monitoring well that shows consistent COC concentrations exceeding cleanup levels. Distance-based attenuation rates will be calculated using wells with the highest concentrations parallel to the direction of groundwater flow. Monitoring wells 35BWW04, 35BWW08, LHSMW58, and 35BWW14 are expected to be the primary focus of analysis at the LHAAP-35B (37) site due to high COC concentrations. Thus, data from these wells will be evaluated for meaningful trends indicating decreasing concentrations and/or mass.

4.1.3 Second Line of Evidence

The second line of evidence uses chemical analytical data in mass balance to show that decreases in contaminant and electron acceptor/donor concentrations can be directly correlated to increases in metabolic end-products or daughter compounds. This evidence can be used to show groundwater conditions are sufficiently favorable to natural attenuation so that degradation of chlorinated solvent contaminants can occur.

The second line of evidence evaluates biogeochemical parameters such as nitrates, sulfates, chloride, TOC, etc. The results of these analytes will be interpreted using the *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater* (USEPA, 1998) to determine whether conditions are favorable for continued MNA.

4.1.4 Third Line of Evidence

The third line of evidence, if necessary, consists of predictive modeling studies and other laboratory/field studies that demonstrate an understanding of the natural attenuation processes occurring at the site and their effectiveness in controlling plume migration and decreasing COC concentrations.

For the MNA evaluation, the presence of microorganisms in the groundwater capable of degrading the COCs will be considered the favorable condition supporting continued MNA.

4.2 LTM Annual Reports

An annual report will be prepared at the end of each year of LTM to present groundwater monitoring results, a description of field activities, and to document other relevant information that may be considered useful for the CERCLA five-year review.

Perimeter well data will be evaluated for plume migration while the data from wells within the plume areas will be evaluated for MNA performance.

The annual report will also provide recommendations, if possible, for reducing the number of monitoring wells to be included in the monitoring program and/or frequency of monitoring events.

4.3 Five-Year Review Reports

CERCLA five-year reviews will be performed for the LHAAP-35B (37) site. The five-year review report will present summaries of information from the annual reports, as well as from the five-year review sampling event, and recommend the future course of action. The progress towards cleanup levels will be evaluated in the five-year review report.

5 SCHEDULE

Table 5-1 shows the estimated duration for each major site activity and timeline. This schedule may be adjusted depending upon the outcome of the bio-plug study and related groundwater monitoring. This schedule is considered to be reasonable and achievable. Adverse weather and unknown site conditions could adversely affect this schedule.

Table 5-1: Durations for Major Site Activities

Activities	Duration	Elapsed Time
Additional Delineation Activities and Groundwater Sampling	10 days	
Installation of Monitoring Wells	5 days	-
First Groundwater Sampling Event (includes new wells; will coincide with bio-plug monitoring)(1)	5 days	-
Establish Land Use Control	1 month	2 months
Completion of Bio-plug Demonstration Pilot Study	2 years	2 years 2 months
Year 1 Quarterly MNA Sampling (4 events)(2)	5 days per event	2.5 years
First Annual Report (Final Document)	3 months	2 years and 9 months
Year 2 Quarterly MNA Sampling (4 events)	5 days per event	4 years
Three years of semiannual monitoring and associated annual reporting	3 years	7 years
CERCLA Five-Year Review	6 months	7 years
Annual Sampling (years 5 through 10)	5 years	12 years
Sample once every five years (repeat activity until cleanup levels are achieved)	-	17, 22, 27, 32 years
Achieve Cleanup Levels	-	30 years or greater

Notes:

- Time frame to achieve cleanup levels is estimated based on the ROD (U.S. Army, 2010).
- Schedule revision expected after CERCLA five-year review.

(1) Since the bio-plug monitoring program and the sampling event for MNA will have some common monitoring wells, if feasible, sampling event after installation of new wells will be done along with the bio-plug monitoring event.

(2) Quarterly monitoring for MNA will be initiated after completion of the bio-plug demonstration study.

6 REFERENCES

AECOM, 2012, *Final Remedial Action Work Plan, LHAAP-67, Aboveground Storage Tank Farm*, *Longhorn Army Ammunition Plant, Karnack, Texas*, December.

Jacobs, 2002, *Final Remedial Investigation 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*, January.

Shaw, 2007, *Final Natural Attenuation Evaluation LHAAP-12, LHAAP-35B (37), and LHAAP-67, Longhorn Army Ammunition Plant*, *Karnack, Texas*, June.

TCEQ, 2010, *Monitored Natural Attenuation Demonstrations under TRRP*, Regulatory Guidance RG-366/TRRP-33, Remediation Division, Austin, Texas.

U.S. Army, 2010, *Final Record of Decision, LHAAP-35B(37), Chemical Laboratory and LHAAP-67,Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant*, *Karnack, Texas*, June.

U.S. Army, 2011, *Final Remedial Design, LHAAP-35B(37), Chemical Laboratory and LHAAP-67,Aboveground Storage Tank Farm, Longhorn Army Ammunition Plant*, *Karnack, Texas*, August.

USEPA, 1998, *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*, EPA/600/R-98/128, September.

USEPA, 1999, *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, Directive 9200.4-17P, U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

APPENDIX A: WELL INSTALLATION AND SAMPLING COLLECTION REPORT (FEBRUARY 2012)

00119302

Longhorn Army Ammunition Plant
Well Installation and Sampling

Completion Report

Chemical Laboratory (LHAAP-37)
Karnack, Texas

Contract No.: W912BV-09-D-2022
Task Order No.: 0007

Prepared By:

CHEROKEE NATION™
Cherokee CRC

Tulsa, Oklahoma

Prepared For:

United States Army Corps of Engineers
Tulsa, Oklahoma

April 11, 2012

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Acronyms and Abbreviations

CCRC	Cherokee CRC, LLC
ID	Identification
ID/IQ	Indefinite Deliverable/Indefinite Quantity
IDW	Investigation Derived Waste
MW	Monitoring Well
HASP	Health and Safety Plan
USACE	United States Army Corps of Engineers
USCS	Unified Soil Classification System
ug/L	Micrograms per Liter
SESOPP	Shaw Environmental Standard Operating Project Procedure
LHAAP	Longhorn Army Ammunition Plant

INTRODUCTION

Cherokee CRC, LLC (CCRC) is a contractor to the United States Army Corps of Engineers (USACE) Tulsa District under an Indefinite Deliverable/Indefinite Quantity (ID/IQ) Contract (W912BV-09-R-2022) and is assigned task orders to provide environmental services. CCRC was tasked under Task Order #7 to provide environmental services at the Longhorn Army Ammunition Plant (LHAAP), chemical laboratory, located in Karnack, Texas a site location map can be found in (**Appendix H**). Task Order #7 requires CCRC to install 3 monitoring wells (MW) 35BWW14, 35BWW11, and 35BWW09, and collect groundwater samples from five monitoring wells (MW) 35BWW14, 35BWW11, 35BWW09, 35BWW08, and 35BWW04.

SUMMARY

The CCRC team conducted a clearing operation to remove trees and vegetation around the well sites on 01/23/2012. Jones Tree Service was onsite at 0830 hours to clear an area around the well sites large enough for the drill rig to operate. All well sites were cleared by 1200 hours. Prior to commencement of work, the CCRC team performed a tailgate safety meeting (**Appendix A**) as stated in the Shaw Environmental project Health and Safety Plan (HASP) contained in the Shaw Environmental Final Installation-Wide Work Plan (Shaw2006).

Drilling operations began on 01/24/2012. Mohawk Drilling personnel Ryan Thompson and Alan Brantley were the drillers installing the MWs. Drilling began on MW 35BWW14 on 01/24/2012 at approximately 0905 hours and the well was completed on 01/26/2012 at approximately 0945 hours. Installation of MW 35BWW11 began on 01/24/2012 and was completed on 01/26/2012 at approximately 1110 hours. Installation of MW 35BWW09 began on 01/25/2012 and was completed on 01/26/2012 at approximately 1240 hours. During well installation John Freise of Cherokee CRC logged the borings and classified the cuttings according to the Unified Soil Classification System (USCS). CCRC followed the Shaw Environmental Standard Operating Project Procedure (SESOPP) for LHAAP for Well Installation. One exception from the Shaw procedure was implemented. The cure time for the bentonite pellets was changed to 1-hour in lieu of the 8-hour cure time called for in the SESOPP. This change was agreed upon by the USACE. The justification for this change was to accelerate the well installation process and the 1-hour cure time is standard operating procedure for Mohawk Drilling. The boring logs, well completion forms, and the Texas well reports are located in (**Appendix B)**. The field logbook entries are located in (**Appendix C**). The geographic positions of the new wells are as follows:

Well ID	Latitude: Decimal Degrees	Longitude: Decimal Degrees
35BWW09	32.67981810° N	94.14565970° W
35BWW11	32.67943120° N	94.14482640° W
35BWW14	32.68028130° N	94.14443340° W

Development of MW 35BWW09 began on 01/27/2012 by John Freise at approximately 0750 hours and the well was sufficiently developed by 1215 hours. Development of MW 35BWW14 began on 02/08/2012 by John Freise and Dwayne Beavers of Cherokee CRC at approximately 1305 hours and the well was sufficiently developed by 1444 hours. Development of MW 35BWW11 began on 02/08/2012 by John Freise and Dwayne Beavers at approximately 1535 hours and the well was sufficiently developed by 1758 hours. The wells were developed following the SESOPP for LHAAP for Well Development. The well development field forms are located in (**Appendix D**). The field logbook entries are located in (**Appendix C**).

Sampling activities began on 02/09/2012 by John Freise and Dwayne Beavers. Prior to sampling, CCRC measured static water levels and purged each monitoring well utilizing a peristaltic pump and low flow sampling protocols until stabilization parameters were met according to SESOPP for LHAAP for groundwater sampling. Low flow purging began on MW 35BWW14 on 02/09/2012 at approximately 0822 hours. Stabilization criteria were met at 0851 hours and samples were collected at 0900 hours. Low flow purging began on MW 35BWW11 on 02/09/2012 at approximately 0930 hours. Stabilization criteria were met at approximately 1024 hours and samples were collected at 1027 hours. Low flow purging began on MW 35BWW09 on 02/09/2012 at approximately 1044 hours. Stabilization criteria were met at approximately 1120 hours and samples were collected at 1123 hours. A duplicate sample DUP-1 was collected at MW 35BWW09 at 1128 hours immediately following the collection of sample 35BWW09. Low flow purging began on MW35BWW04 on 02/09/2012 at approximately 1144 hours. Stabilization criteria were met at approximately 1221 hours and samples were collected at 1221 hours. Low flow purging began on MW 35BWW08 on 02/09/2012 at approximately 1229 hours. Stabilization criteria were met at approximately 1305 hours and samples were collected at 1308 hours.

All samples were labeled and placed into an ice chest containing wet ice. The Chain of Custody (COC) was filled out for all samples including the duplicate DUP-1, field blank FB1, and the trip blank TB1. Samples were shipped via Fed Ex next day air to the Test America laboratory in Denver, CO on 02/09/2012. The samples were received at the laboratory on 02/10/2012 at a temperature of 2.4° C. The chain of custody and field sampling forms can be found in (**Appendix E**).

The sample results were received by Cherokee CRC from Test America Laboratories on 02/22/2012. The following is a list of all detections from all samples analyzed by the laboratory:

LHAAP SITE 37 Summary of Detections

Sample ID	Analyte	Results	Units
TB1	Methylene Chloride	0.90	ug/L
FB1	Methylene Chloride	0.62	ug/L
35BWW14	1,1-Dichloroethane	2.8	ug/L
	1,1-Dichloroethene	29	ug/L
	Cis-1, 2-Dichloroethene	7.6	ug/L
	Methylene Chloride	1.5	ug/L
	Trans-1, 2-Dichloroethene	0.36	ug/L
	Tetrachloroethene	10	ug/L
	1,2-Dichloroethene, Total	7.9	ug/L
	Trichloroethene	63	ug/L
	Vinyl Chloride	2.6	ug/L

Sample ID	Analyte	Results	Units
35BWW11	Methylene Chloride	0.60	ug/L
	Tetrachloroethene	0.26	ug/L
35BWW09	1,1-Dichloroethene	0.30	ug/L
	Cis-1, 2-Dichloroethene	0.43	ug/L
	Methylene Chloride	1.2	ug/L
	1, 2-Dichloroethene, Total	0.43	ug/L
	Trichloroethene	68	ug/L
Dup-1 (35BWW09)	1,1-Dichloroethene	0.29	ug/L
	Cis-1, 2-Dichloroethene	0.38	ug/L
	Methylene Chloride	1.3	ug/L
	1, 2-Dichloroethene, Total	0.38	ug/L
	Trichloroethene	68	ug/L
35BWW04	1, 1 Dichloroethane	0.57	ug/L
	1, 1 Dichloroethene	1.7	ug/L
	Cis-1, 2-Dichloroethene	0.51	ug/L
	Methylene Chloride	0.62	ug/L
	Tetrachloroethene	17	ug/L
	1, 2-Dichloroethene, Total	0.51	ug/L
	Trichloroethene	5.9	ug/L
IDW-1	1, 1 Dichloroethane	0.90	ug/L
	1, 1 Dichloroethene	7.0	ug/L
	1,2,4-Trimethylbenzene	8.9	ug/L
	1,3,5-Trimethylbenzene	3.7	ug/L
	4-Isopropyltoluene	0.37	ug/L
	Chloroform	0.21	ug/L
	Cis-1, 2-Dichloroethene	2.6	ug/L
	Ethylebenzene	1.6	ug/L
	Isopropylbenzene	0.20	ug/L
	Methylene Chloride	0.56	ug/L
	m-Xylene & p-Xylene	7.2	ug/L
	Napthalene	3.7	ug/L
	n-Butylbenzene	0.32	ug/L
	N-Propylbenzene	0.46	ug/L
	o-Xylene	7.7	ug/L
	Tetrachloroethene	2.6	ug/L
	1, 2-Dichloroethene, Total	2.6	ug/L
	Trichloroethene	33	ug/L
	Vinyl Chloride	0.61	ug/L
	Flashpoint	>160	Degrees F
	pH	7.3	Standard Units
IDW-2	Methylene Chloride	0.95	ug/L
	Tetrachloroethene	2.1	ug/L
	Trichloroethene	0.63	ug/L
	Ignitability	NO	No Unit
	Percent Moisture	21	%

Sample ID	Analyte	Results	Units
IDW-2	pH-soluble	6.7	Standard Units
35BWW08	1, 1 Dichloroethene	0.22	ug/L
	Cis-1, 2-Dichloroethene		ug/L
	Methylene Chloride	0.58	ug/L
	1, 2-Dichloroethene, Total	0.30	ug/L
	Trichloroethene	37	ug/L

A copy of the detected results executive summary from Test America Laboratory can be found in (**Appendix F**).

Investigative Derived Wastes (IDW) which consisted of all soil removed from the borings during well installation, all groundwater removed during well development and sampling, and all water used for decontamination of the drilling augers and sampling and development equipment were placed into 55 gallon drums. The drums were sealed and labeled "Analysis Pending". There were 17 drums of IDW generated during well installation, development, and sampling. A composite sample was taken from all the drums containing soil and another composite sample was taken from all the drums containing water. IDW-1 was the composite sample of the IDW water and sample IDW-2 was the composite sample of the IDW soil.

The IDW waste profile was completed and the waste was determined to be non-hazardous. The drums were removed from the site by Stericycle on 03/07/2012. A copy of the waste profiles and manifest can be found in (**Appendix G**).

References

Shaw Environmental, 2006, Final Installation-Wide Work Plan, Karnack Texas, Houston, Texas

APPENDIX A

Daily Safety Meeting Log

<table>
<tr><th colspan="2">DAILY SAFETY TRAINING MEETINGS</th></tr>
<tr><td colspan="2">Date of Training: 01-<s>4</s> 23-12</td></tr>
<tr><td>Crew: Jones Tree Service, CCRC Mohawk Drilling</td><td>Craft(s): Clearing, Drilling, Env. Sci</td></tr>
<tr><td colspan="2">BRIEFLY DESCRIBE SPECIFIC TRAINING TOPICS COVERED</td></tr>
<tr><td colspan="2">1. Safety Gear, Procedures</td></tr>
<tr><td colspan="2">2. Health & Safety Plan, Emergency Preparedness,</td></tr>
<tr><td colspan="2">3.</td></tr>
<tr><td colspan="2">REMARKS</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>Total Employees on Crew(s):</td><td>Total in Attendance:</td></tr>
<tr><td colspan="2">SIGNATURE OF EMPLOYEES ATTENDING</td></tr>
<tr><td colspan="2">[signatures]</td></tr>
<tr><td colspan="2">Complete all sections fully and submit to the Project Supervisor or Safety Representative</td></tr>
<tr><td>Supervisor: John Friese</td><td>Job Title: Env. Scientist</td></tr>
</table>

00119312

DAILY SAFETY TRAINING MEETINGS

Date of Training: 1-24-12	
Crew: CCRC, Mohawk Drilling	**Craft(s):** Drilling

BRIEFLY DESCRIBE SPECIFIC TRAINING TOPICS COVERED

1. PPE
2. Safety Plan
3. Emergency Procedures

REMARKS

Total Employees on Crew(s):	**Total in Attendance:** 6

SIGNATURE OF EMPLOYEES ATTENDING

[signature]
Ryan Thompson
[signature]
[signature]
Ray Long USACE
[signature]

Complete all sections fully and submit to the Project Supervisor or Safety Representative

Supervisor: John Freise	**Job Title:** Env. Sci.

00119313

DAILY SAFETY TRAINING MEETINGS

Date of Training: 1/25/12	
Crew: Mohawk Drilling, CCRC	**Craft(s):** Drilling

BRIEFLY DESCRIBE SPECIFIC TRAINING TOPICS COVERED

1. PPE
2. Safety Plan
3. Emergency Procedures

REMARKS

Total Employees on Crew(s):	**Total in Attendance:**

SIGNATURE OF EMPLOYEES ATTENDING

[signature]
[signature]
Billy [signature]
[signature]
Ryan Thomp[signature]
[signature]
Roy Long USACE

Complete all sections fully and submit to the Project Supervisor or Safety Representative

Supervisor: John Freise CCRC	**Job Title:** Envi Sci

DAILY SAFETY TRAINING MEETINGS

Date of Training: 1/26/12	
Crew: Mohawk / CCRC	Craft(s): Well Drilling
BRIEFLY DESCRIBE SPECIFIC TRAINING TOPICS COVERED	
1. PPE	
2. Safety Plan	
3. Emergency Procedures	
REMARKS	
Total Employees on Crew(s): 3	Total in Attendance: 2
SIGNATURE OF EMPLOYEES ATTENDING	
[signature]	
[signature]	
[signature]	
Complete all sections fully and submit to the Project Supervisor or Safety Representative	
Supervisor: John Freise	Job Title: Env. Sci

APPENDIX B

Well and Boring Logs

n

00119316

Hole No. 35BW-14

DRILLING LOG	DIVISION	INSTALLATION	SHEET OF SHEETS

1. PROJECT: CHAAP Site 37
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY: Mohawk Drilling
4. HOLE NO. (As shown on drawing title and title number): 35BW-14
5. NAME OF DRILLER: Alan Bentley, Ryan Thompson
6. DIRECTION OF HOLE: [x] VERTICAL [ ] INCLINED ______ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE: 35'
10. SIZE AND TYPE OF BIT: 6 5/8 HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURERS DESIGNATION OF DRILL: CME 45C
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE | STARTED 1/24/12 | COMPLETED 1/26/12
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		5	SM, lt Br, WS, slightly plastic, moist			
		10	SM, lt Br, WS not plastic, dry			
		15–20	SM, lt Br, w/ trace W fine sand, WS not plastic, moist			x Encountered ground water at 19' bgs
		25	SM, lt Br, WS not plastic, moist			
		30–35	SM, lt Br, WS not plastic, Wet			
			Bottom of Bore hole 35' bgs complete @ 1007			

ENG FORM 1836 MAR 71 | PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT | HOLE NO.

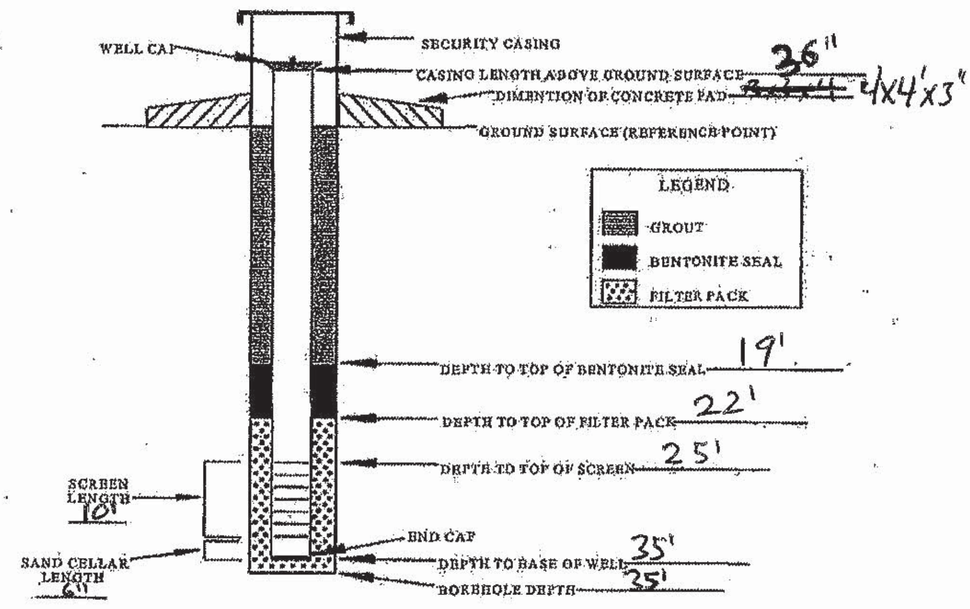
ATTACHMENT B

WELL COMPLETION FORM (Stickup or Above Grade Completion Well)

FIELD REPRESENTATIVE: John Freise
DRILLING CONTRACTOR: Mohawk Drilling
DRILLING TECHNIQUE: HSA
AUGER SIZE AND TYPE:
BOREHOLE IDENTIFICATION: 35BWW14
BOREHOLE DIAMETER: 11"
WELL IDENTIFICATION: 35BWW14
WELL CONSTRUCTION START DATE: 1/24/12
WELL CONSTRUCTION COMPLETE DATE:
SCREEN MATERIAL: Sch 40 PVC
SCREEN DIAMETER: 4"
STRATUM-SCREENED INTERVAL (FT): ~~[illegible]~~ 10'
CASING MATERIAL: Sch 40 PVC
CASING DIAMETER: 4"

TYPE OF FILTER PACK: 20-40 FilterSil Sand
GRADIATION:
AMOUNT OF FILTER PACK USED: 10 bags
TYPE OF BENTONITE: PDS Wellplug
AMOUNT BENTONITE USED: 3 bags
TYPE OF CEMENT: Portland Cement/BenSeal
AMOUNT CEMENT USED:
GROUT MATERIALS USED: Portland Cement BenSeal Powdered Bentonite
DIMENSIONS OF SECURITY CASING: 8" diameter
TYPE OF WELL CAP: 4" J-Plug
TYPE OF END CAP: PVC Cone
COMMENTS:

SPECIAL CONDITIONS (describe and draw)



INSTALLED BY: Alan Brantley
INSTALLATION OBSERVED BY: John Freise, CRC
DISCREPANCIES:

00119318

Hole No. 35BWW11

DRILLING LOG	DIVISION	INSTALLATION	SHEET OF SHEETS

1. PROJECT: LHAAP Site 37
2. LOCATION (Coordinates or Station):
3. DRILLING AGENCY: Mohawk Drilling
4. HOLE NO. (As shown on drawing title and title number): 35BWW11
5. NAME OF DRILLER: Alan Brantley, Ryan Thompson
6. DIRECTION OF HOLE: ☑ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN:
8. DEPTH DRILLED INTO ROCK:
9. TOTAL DEPTH OF HOLE: 35'
10. SIZE AND TYPE OF BIT: 11" OD 6 5/8" ID HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL):
12. MANUFACTURERS DESIGNATION OF DRILL: CME 45C
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN: DISTURBED: UNDISTURBED:
14. TOTAL NUMBER CORE BOXES:
15. ELEVATION GROUND WATER:
16. DATE HOLE: STARTED 1/24/12 COMPLETED 1/26/12
17. ELEVATION TOP OF HOLE:
18. TOTAL CORE RECOVERY FOR BORING:
19. SIGNATURE OF INSPECTOR: [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		0–5	ML, lt Br, WS, slightly plastic, moist			
		5–11	ML, Gr, Clay w/ lt Br fine Sand, WS, slightly plastic, moist			
		11–15	SC, lt Br, WS, Sandy Clay slightly plastic, moist			
		15–20	SC, lt Br, fine Sand, WS not-plastic, moist			
		20–30	SC, lt Br, Clayey Sand WS, slightly plastic, moist			*Encountered Ground water @ 23' bgs
		30–35	SC, lt Br, Clay Sand w/ Gr Clay mottled, WS moist +			
		35	Bottom of borehole 35' bgs complete @ 1533			

ENG FORM 1836 MAR 71 PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) PROJECT HOLE NO.

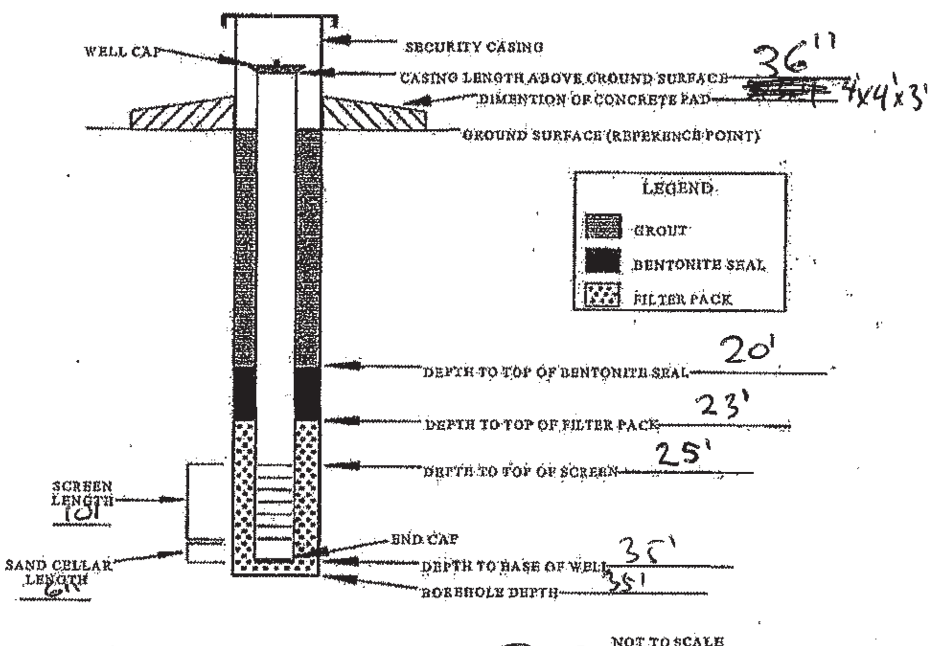
ATTACHMENT B

WELL COMPLETION FORM (Stickup or Above Grade Completion Well)

FIELD REPRESENTATIVE: John Freise CCRC
DRILLING CONTRACTOR: Mohawk Drilling
DRILLING TECHNIQUE: HSA
AUGER SIZE AND TYPE: 11" HSA Hollow Auger
BOREHOLE IDENTIFICATION: 35 BWW 11
BOREHOLE DIAMETER: 11"
WELL IDENTIFICATION: 35BWW11
WELL CONSTRUCTION START DATE: 1/24/12
WELL CONSTRUCTION COMPLETE DATE: 1/26/12
SCREEN MATERIAL: Sch 40 PVC
SCREEN DIAMETER: 4"
STRATUM-SCREENED INTERVAL (FT): 10'
CASING MATERIAL: Sch 40 PVC
CASING DIAMETER: 4"

TYPE OF FILTER PACK: 20-40 Filter Sil Sand
GRADIATION:
AMOUNT OF FILTER PACK USED: 15 bags
TYPE OF BENTONITE: PDS Wellplug
AMOUNT BENTONITE USED: 3 bags
TYPE OF CEMENT: Portland Cement / BenSeal
AMOUNT CEMENT USED:
GROUT MATERIALS USED: Portland Cement BenSeal Powdered Bentonite
DIMENSIONS OF SECURITY CASING: 8"
TYPE OF WELL CAP: 4" J-Plug
TYPE OF END CAP: PVC cone
COMMENTS:

SPECIAL CONDITIONS (describe and draw)



INSTALLED BY: Alan Brantley INSTALLATION OBSERVED BY: John Freise, CCRC

DISCREPANCIES:

00119320

Hole No. 35BWW09

DRILLING LOG	DIVISION	INSTALLATION	SHEET OF SHEETS

1. PROJECT LHAAP- Site 37
2. LOCATION (Coordinates or Station)
3. DRILLING AGENCY Mohawk Drilling
4. HOLE NO. (As shown on drawing title and title number) 35BWW09
5. NAME OF DRILLER Alan Brantley, Ryan Thompson
6. DIRECTION OF HOLE ☒ VERTICAL ☐ INCLINED ____ DEG. FROM VERT.
7. THICKNESS OF OVERBURDEN
8. DEPTH DRILLED INTO ROCK
9. TOTAL DEPTH OF HOLE 35'
10. SIZE AND TYPE OF BIT 11" OD, 6 5/8" ID HSA
11. DATUM FOR ELEVATION SHOWN (TBM or MSL)
12. MANUFACTURERS DESIGNATION OF DRILL CME 45C
13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN | DISTURBED | UNDISTURBED
14. TOTAL NUMBER CORE BOXES
15. ELEVATION GROUND WATER
16. DATE HOLE STARTED 1/25/12 COMPLETED 1/26/12
17. ELEVATION TOP OF HOLE
18. TOTAL CORE RECOVERY FOR BORING
19. SIGNATURE OF INSPECTOR [signature]

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	% CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth of weathering, etc., if significant) g
		0–5	SC, lt Br, Sandy Clay, slightly plastic, WS, moist, some silt [illegible]			
		5–10	SC, lt Br, Hard Sandy Clay, not plastic, WS, dry, becoming less sandy			
		10–15	CL, dk Br, hard, PS, silty clay, low plastic, dry			
		15–25	CL, lt Br, hard, WS low plastic, moist becomes slightly plastic			
		25–35	SC, lt Br, Sandy Clay WS, low plastic, moist +			* Groundwater encountered @ 25' bgs
		35	bottom of boring @ 35' complete @ 0932			

ENG FORM 1836 MAR 71 | PREVIOUS EDITIONS ARE OBSOLETE. (TRANSLUCENT) | PROJECT | HOLE NO.

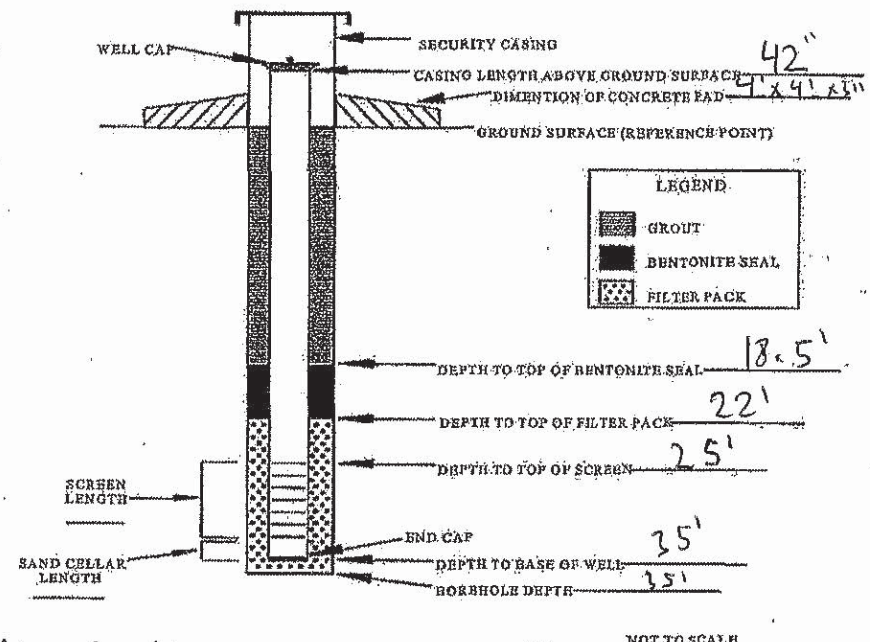
ATTACHMENT B

WELL COMPLETION FORM (Stickup or Above Grade Completion Well)

FIELD REPRESENTATIVE: John Freise
DRILLING CONTRACTOR: Mohawk Drilling
DRILLING TECHNIQUE: HSA
AUGER SIZE AND TYPE: 11" HSA
BOREHOLE IDENTIFICATION:
BOREHOLE DIAMETER: 11"
WELL IDENTIFICATION: 35BMW09
WELL CONSTRUCTION START DATE: 1/25/12
WELL CONSTRUCTION COMPLETE DATE: 1/26/12
SCREEN MATERIAL: Sch 40 PVC
SCREEN DIAMETER: 4"
STRATUM-SCREENED INTERVAL (FT): 10
CASING MATERIAL: Sch 40 PVC
CASING DIAMETER: 4"

TYPE OF FILTER PACK: Filter Srl Sand
GRADATION: 20-40
AMOUNT OF FILTER PACK USED: 15 bags
TYPE OF BENTONITE: PDS Wellplug
AMOUNT BENTONITE USED: 3 bags
TYPE OF CEMENT: Portland / Ben Seal
AMOUNT CEMENT USED:
GROUT MATERIALS USED: Portland Cement, Ben Seal powdered bentonite
DIMENSIONS OF SECURITY CASING: 8"
TYPE OF WELL CAP: 4" J-Plug
TYPE OF END CAP: PVC Cone
COMMENTS:

SPECIAL CONDITIONS (describe and draw)



INSTALLED BY: Alan Brantley INSTALLATION OBSERVED BY: John Freise, CCRC

DISCREPANCIES:

00119322

Attention Owner: Confidentiality Privilege Notice on reverse side of owner's copy.

Texas Department of Licensing and Regulation
Water Well Driller/Pump Installer Section
P.O. Box 12157 Austin, Texas 78711 (512)463-7880 FAX (512)463-8616
Toll free (800)803-9202
Email address: water.well@license.state.tx.us Web address: www.license.state.tx.us

This form must be completed and filed with the department and owner within 60 days upon completion of the well.

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name:	Address:	City:	State:	Zip:
Corps of Engineers	1645 S. 101st E. Ave.	TULSA	OK	74128

2) WELL LOCATION

Well # or # of wells drilled	County:	Physical Address:	City:
35BWW09	Harrison	Former Army Ammo PLANT	KARNACK, TX.

3) Type of Work
☒ New Well ☐ Reconditioning
☐ Replacement ☐ Deepening

Lat. 32.6798181 **Long.** 94.1456597 **Grid #**

4) Proposed Use (check) ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Extraction ☐ Frac
☐ Industrial ☐ Irrigation ☐ Injection ☐ Closed-Loop Geothermal ☐ De-watering ☐ Test well
☐ Rig Supply ☐ Stock ☐ Public Supply – If Public Supply, were plans approved? ☐ Yes ☐ No

5) N↑

6) Drilling Date
Started 01 / 25 / 12
Completed 01 / 26 / 12

Diameter of Hole

Dia.(in)	From (ft)	To (ft)
11"	Surface	35

7) Drilling Method (check)
☐ Driven ☐ Air Rotary ☐ Mud Rotary
☐ Bored ☐ Air Hammer ☐ Cable Tool
☐ Jetted ☒ Hollow Stem Auger
☐ Reverse Circulation
☐ Other

From (ft)	To (ft)	Description and color of formation material
0	5	SC, light brown, sandy clay
5	10	SC, light brown, Hard Sandy clay
10	15	CL, dark brown, Hard tight Clay
15	20	CL, light brown, Hard
20	25	CL, light brown, clay
25	30	SC, light brown, Sandy Clay
30	35	SC, light brown, Sandy Clay

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion ☐ Open Hole ☐ Straight Wall
☐ Under-reamed ☒ Gravel Packed ☐ Other
Gravel packed interval from: 22 ft. to: 35 ft. Size: 20/40

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft) From	Setting (ft) To	Gage Casing Screen
4	new	PVC Riser	0	25	sch 40
4	new	PVC .010 Screen	25	35	sch 40

9) Annular Seal Data: i.e. (from 0 ft to 100 ft #sacks & material 13 cement)
from 19 ft. to 22 ft. #sacks & material 3- Bentonite
from 2 ft. to 19 ft. #sacks & material 6- Portland
from ___ ft. to ___ ft. #sacks & material ___
Method Used Thru Augers Performed By Driller
Distance to septic field or other concentrated contamination ___ ft.
Distance to Property Line ___ ft
Method Verified: ___ Approved by Variance # ___

13) Plugged ☐ Well plugged within 48 hour

Casing left in well: From (ft)	To (ft)	Cement/Bentonite placed in well: From (ft)	To (ft)	#Sacks & Material used

10) Surface Completion (If steel cased, leave blank)
☒ Surface Slab Installed ☐ Surface Sleeve Installed
☐ Pitless Adapter Used ☐ Alternative Procedure Used

14) Type Pump
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other
Depth to pump bowls, cylinder, jet, etc., ___ ft.

11) Water Level
Static level ___ ft. below surface Date: _/_/_
Artesian Flow ___ gpm

12) Packers:

Type	Depth	Type	Depth

15) Water Test
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ___ gpm with ___ ft. drawdown after ___ hrs.

16) Water Quality
Type of water ___ Depth of Strata: ___ Was a chemical analysis made? ☐ Yes ☐ No
Did you knowingly penetrate a strata which contains undesirable constituents? ☐ Yes ☐ No If yes, Continue:
Check One: ☐ Naturally poor-quality groundwater – type ___ ☐ Hydrocarbons (i.e. gas, oil, etc.)
☐ Hazardous material/waste contamination encountered ☐ Other (describe) ___

☐ *I certify that while drilling, deepening, or otherwise altering the above described well, undesirable water or constituents was encountered and the landowner was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.*

By signing this well report, I certify that I drilled or supervised the drilling of this well and that each and all of the statements herein are true and correct.

Company & Individual's Name: (type or print) MOHAWK Drilling, INC. Lic. No.: 54689M

Address: 10010 E. 16th STREET City: TULSA State: OK Zip 74128

Signature: [signature] 2/16/12 Signature: ___
Licensed Driller/Pump Installer Date Apprentice Apprentice Reg. Number

TDLR FORM 001WWD / 11-10 *TDLR (Original)* *Landowner (copy)* *Driller/Pump Installer (copy)*

00119323

Attention Owner:
Confidentiality Privilege Notice on reverse side of owner's copy.

Texas Department of Licensing and Regulation

Water Well Driller/Pump Installer Section
P.O. Box 12157 Austin, Texas 78711 (512)463-7880 FAX (512)463-8616
Toll free (800)803-9202
Email address: water.well@license.state.tx.us Web address: www.license.state.tx.us

This form must be completed and filed with the department and owner within 60 days upon completion of the well.

WELL REPORT

A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name:	Address:	City:	State:	Zip:
Corps of Engineers	1645 S. 101st E. Ave.	Tulsa	OK	74128

2) WELL LOCATION

Well # or # of wells drilled	County:	Physical Address:	City:
35BWW11	Harrison	Former Longhorn Army Ammo Plant	Karnack TX.

3) Type of Work
☒ New Well ☐ Reconditioning
☐ Replacement ☐ Deepening

Lat. 32.6794312 Long. 94.1448264 Grid #

4) Proposed Use (check) ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Extraction ☐ Frac ☐ Industrial ☐ Irrigation ☐ Injection ☐ Closed-Loop Geothermal ☐ De-watering ☐ Test well ☐ Rig Supply ☐ Stock ☐ Public Supply – If Public Supply, were plans approved? ☐ Yes ☐ No

5) NT

6) Drilling Date
Started 01/24/12
Completed 01/26/12

Diameter of Hole

Dia.(in)	From (ft)	To (ft)
11"	Surface	35'

7) Drilling Method (check)
☐ Driven ☐ Air Rotary ☐ Mud Rotary
☐ Bored ☐ Air Hammer ☐ Cable Tool
☐ Jetted ☒ Hollow Stem Auger
☐ Reverse Circulation
☐ Other

From (ft)	To (ft)	Description and color of formation material
0	5	ML, light brown, clayey silt
5	10	ML, Gray Clay, w/ light brown sand
10	15	SC, light brown, Sandy Clay
15	20	SC, light brown, fine sand
20	25	SC, light brown, Clayey Sand
25	30	SC, light brown, Clayey Sand
30	35	SC, light brown, Clayey Sand w/ gray clay, mottled

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion ☐ Open Hole ☐ Straight Wall ☐ Under-reamed ☒ Gravel Packed ☐ Other
Gravel packed interval from: 22 ft. to: 35 ft. Size: 20/40

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft) From	To	Gage Casing Screen
4	new	PVC Riser	0	25	sch 40
4	new	PVC .010 Screen	25	35	sch 40

9) Annular Seal Data: i.e. (from 0 ft to 100 ft #sacks & material 13 cement)
from 19 ft. to 22 ft. #sacks & material 3-Bentonite
from 2 ft. to 19 ft. #sacks & material 6-Portland
from ___ ft. to ___ ft. #sacks & material
Method Used Thru Augers Performed By Driller
Distance to septic field or other concentrated contamination ___ ft.
Distance to Property Line ___ ft
Method Verified: ___ Approved by Variance # ___

13) Plugged ☐ Well plugged within 48 hour

Casing left in well: From (ft)	To (ft)	Cement/Bentonite placed in well: From (ft)	To (ft)	# Sacks & Material used

10) Surface Completion (If steel cased, leave blank)
☒ Surface Slab Installed ☐ Surface Sleeve Installed
☐ Pitless Adapter Used ☐ Alternative Procedure Used

14) Type Pump
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder
☐ Other
Depth to pump bowls, cylinder, jet, etc., ___ ft.

11) Water Level
Static level ___ ft. below surface Date: __/__/__
Artesian Flow ___ gpm

12) Packers:

Type	Depth	Type	Depth

15) Water Test
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ___ gpm with ___ ft. drawdown after ___ hrs.

16) Water Quality
Type of water ___ Depth of Strata: ___ Was a chemical analysis made? ☐ Yes ☐ No
Did you knowingly penetrate a strata which contains undesirable constituents? ☐ Yes ☐ No If yes, Continue:
Check One: ☐ Naturally poor-quality groundwater – type ___ ☐ Hydrocarbons (i.e. gas, oil, etc.)
☐ Hazardous material/waste contamination encountered ☐ Other (describe)

☐ *I certify that while drilling, deepening, or otherwise altering the above described well, undesirable water or constituents was encountered and the landowner was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.*

By signing this well report, I certify that I drilled or supervised the drilling of this well and that each and all of the statements herein are true and correct.

Company & Individual's Name: (type or print) Mohawk Drilling, Inc. Lic. No.: 54689M
Address: 10010 E. 16th Street City: Tulsa State: OK Zip 74128

Signature: [signature] 2/6/12 Signature:
Licensed Driller/Pump Installer Date Apprentice Apprentice Reg. Number

TDLR FORM 001WWD / 11-10 *TDLR (Original)* *Landowner (copy)* *Driller/Pump Installer (copy)*

Attention Owner: Confidentiality Privilege Notice on reverse side of owner's copy.

Texas Department of Licensing and Regulation

Water Well Driller/Pump Installer Section
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This form must be completed and filed with the department and owner within 60 days upon completion of the well.

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A. WELL IDENTIFICATION AND LOCATION DATA

1) OWNER

Name:	Address:	City:	State:	Zip:
Corps of Engineers	1645 S. 101st E. Ave	TULSA	OK	74128

2) WELL LOCATION

Well # or # of wells drilled	County:	Physical Address:	City:
35BWW14	Harrison	Former Longhorn Army Ammo Plant	KARNACK, TX.

3) Type of Work
☒ New Well ☐ Reconditioning ☐ Replacement ☐ Deepening

Lat. 32.6802813 Long. 94.1444334 Grid #

4) Proposed Use (check) ☒ Monitor ☐ Environmental Soil Boring ☐ Domestic ☐ Extraction ☐ Frac ☐ Industrial ☐ Irrigation ☐ Injection ☐ Closed-Loop Geothermal ☐ De-watering ☐ Test well ☐ Rig Supply ☐ Stock ☐ Public Supply – If Public Supply, were plans approved? ☐ Yes ☐ No

5) N↑

6) Drilling Date
Started 01 / 24 / 12
Completed 01 / 26 / 12

Diameter of Hole

Dia.(in)	From (ft)	To (ft)
11"	Surface	35'

7) Drilling Method (check)
☐ Driven ☐ Air Rotary ☐ Mud Rotary ☐ Bored ☐ Air Hammer ☐ Cable Tool ☐ Jetted ☒ Hollow Stem Auger ☐ Reverse Circulation ☐ Other

From (ft)	To (ft)	Description and color of formation material
0	5	SM, light brown
5	10	SM, light brown
10	15	SM, light brown
15	20	SM, light brown, w/ trace white sand
20	25	SM, light brown w/ trace fine white sand
25	30	SM, light brown
30	35	SM, light brown

(Use reverse side of Well Owner's copy, if necessary)

8) Borehole Completion ☐ Open Hole ☐ Straight Wall ☐ Under-reamed ☒ Gravel Packed ☐ Other
Gravel packed interval from: 22 ft. to: 35 ft. Size: 20/40

Casing, Blank Pipe, and Well Screen Data

Dia. (in.)	New Or Used	Steel, Plastic, etc. Perf., Slotted, etc Screen Mfg., if commercial	Setting (ft) From	Setting (ft) To	Gage Casing Screen
4	new	Plastic Riser	0	25	sch. 40
4	new	PVC .010 screen	25	35	sch. 40

9) Annular Seal Data: i.e. (from 0 ft to 100 ft #sacks & material 13 cement)
from 19 ft. to 22 ft. #sacks & material 3 - Bentonite
from 2 ft. to 19 ft. #sacks & material 6 - Portland
from ____ ft. to ____ ft. #sacks & material ____
Method Used Thru Augers Performed By Driller
Distance to septic field or other concentrated contamination ____ ft.
Distance to Property Line ____ ft
Method Verified: ____ Approved by Variance # ____

10) Surface Completion (If steel cased, leave blank)
☒ Surface Slab Installed ☐ Surface Sleeve Installed ☐ Pitless Adapter Used ☐ Alternative Procedure Used

11) Water Level
Static level ____ ft. below surface Date: / /
Artesian Flow ____ gpm

12) Packers:

Type	Depth	Type	Depth

13) Plugged ☐ Well plugged within 48 hour

Casing left in well: From (ft)	To (ft)	Cement/Bentonite placed in well: From (ft)	To (ft)	# Sacks & Material used

14) Type Pump
☐ Turbine ☐ Jet ☐ Submersible ☐ Cylinder ☐ Other ____
Depth to pump bowls, cylinder, jet, etc., ____ ft.

15) Water Test
Type test ☐ Pump ☐ Bailer ☐ Jetted ☐ Estimated
Yield: ____ gpm with ____ ft. drawdown after ____ hrs.

16) Water Quality
Type of water ____ Depth of Strata: ____ Was a chemical analysis made? ☐ Yes ☐ No
Did you knowingly penetrate a strata which contains undesirable constituents? ☐ Yes ☐ No If yes, Continue:
Check One: ☐ Naturally poor-quality groundwater – type ____ ☐ Hydrocarbons (i.e. gas, oil, etc.)
☐ Hazardous material/waste contamination encountered ☐ Other (describe) ____

☐ *I certify that while drilling, deepening, or otherwise altering the above described well, undesirable water or constituents was encountered and the landowner was informed that such well must be completed or plugged in such a manner as to avoid injury or pollution.*

By signing this well report, I certify that I drilled or supervised the drilling of this well and that each and all of the statements herein are true and correct.

Company & Individual's Name: (type or print) MOHAWK Drilling, INC. Lic. No.: 54689M

Address: 10010 E. 16th STREET City: TULSA State: OK Zip 74128

Signature: [signature] 2/16/12 Signature:

Licensed Driller/Pump Installer Date Apprentice Apprentice Reg. Number

APPENDIX C

Field Notebook Entries

Wx Sunny, Clear

01/23/2004 00119326

LHAAP-37 Well Installation, Karnack, TX

* Dozer service Lytt Jones w/ Jone Tree service on site @ 0830 to clear well sites.
* CCRC Personnel, John Freise, Env. Sci.
Went over safety guidelines and procedures.
— All well sites clear @ 1200 hrs. by Jones Tree Service

1/24/12 WX: Clear cool 48°F

0830 CCRC, ~~[illegible]~~ Mohawk Drilling

Mobilizing to well site 35 PWW 14

Materials for Well Construction

x PDS Wellplug bentonite plug (50lb)

x Filtersil Quartz Filter Sand 20-40 (50lb)

x CME 45C track rig   *Portland Cement } grout

x 6 5/8 ID HS Augers 11" OD   *Ben Seal Bentonite Powder

Drillers Ryan Thompson (Mohawk)

Alan Brantley

Over hole @ 0905, Classify Cuttings

0-5 SM, lt Br, WS, slightly plastic, moist

5-10 SM, lt Br, WS, not plastic, dry

10-15 SM, lt Br, WS, not plastic, moist

15-20 SM, lt Brw trace white fine sands, WS, not plastic

moist

20-25, SM, lt Br w/trace W fine sand, R mottled, WS,

not plastic, moist

25-30 SM, lt Br, WS, not plastic, moist

30-35 SM, lt Br, WS, not plastic, wet

Bottom of Boring 35' bgs @ 1007, Installation

of 10' 0.010 4" PVC screen and 4" PVC riser

@ 1050, Installation of filter pack 10 bags

to a depth of 22' bgs, @ 1150

Installation of bentonite hole plug 3 bags

to a depth of 19' bgs, @ 1204

*Verified augers were decomed

*Ground water @ 28'

35PWW14

Filter Pack, Bentonite, tremied in through Augers

00119328

1/24/12
35BWW14 installation Cont:
Grout installation, 95% Portland Cement, 5% Ben-Seal bentonite powder, grouting began @ 1625, grout up to 3' bgs @ 1646

1/26/12 Surface completion of 35BWW14 started pouring pad ~~5x3x4~~ 4x4x3 and setting well protector 8" steel pipe and ~~steel~~ bollards 3" steel @ 0745 completed @ 0945

1/24/12 LHAAP 37

Installation of well 35BWW11 over well @ 1430

drilling @ 1434, * Drillers hit object @ 4' bgs may be abandoned sewer line, Moving well location 4' NE of GPS coordinates over new location @ 1442, drilling @ 1445

Classify Cuttings

0-5 ML lt Br, WS, ~~Medium~~ slightly plastic, moist

5-10 ML Gr Clay, w lt Br fine Sand, WS, slightly plastic, moist

10-15 SC lt Br, WS, Sandy Clay, Slightly plastic moist

15-20 SC lt Br, fine Sand, WS, Not-Plastic, moist

20-25 SC lt Br, Clayey Sand, Ws, ~~Medium~~ slightly Plastic, moist

*23' GW

25-30 SC lt Br, Clayey Sand, Ws, Slight plastic, moist

30-35 SC lt Br, Clay Sand, w Gray Clay mottled, WS, moist

Bottom of boring is 35', @ 1533

Well String 6" End Cap, 10' 4" PVC 0.010 screen, 30'4" riser installed @ 1538, Filter pack 15 bags, top of filter 23' bgs installed @ 1613, Bentonite Seal 3 bags, top of seal 20' bgs installed @ 1620, Grouting began @ 0845 on 1/25/12, 95% portland cement, 5% Ben Seal powdered bentonite, grout to 2' bgs @ 0915, Installation of surface completion, 4x4x3 concrete pad, 8" steel well protector, 4, 3" steel bollards began @ 1000 completed @ 1110 on 1/26/12

*Verified Augers were decontaminated

1/25/12 Wx Cloudy and Warm 58°F

* verified Augers were decond

GW @ 25' bgs

Installation of 35BWW09 overwell @ 0720
began drilling @ 0746
Classify Cuttings @ 0747
0-5 SC, ltBr, Sandy Clay, slightly plastic, WS, Moist, some silt dkBr
5-10 SC, ltBr, Hard Sandy Clay, not plastic, WS, dry, becoming less sandy
10-15 CL, dkBr, Hard, PS, silty clay, low plastic dry
15-20 CL, ltBr, Hard, WS, low plastic, moist
20-25 CL, ltBr, WS sandy clay, slightly plastic, moist
25-30 ~~CL~~ SC, ltBr, WS, low plastic, moist+
30-35 SC, ltBr sandy Clay, WS, low plastic, moist+
botton of boring 35' bgs @ 0932
Installation of filter pack began @ 0954, Filter pack upto 22' bgs, 8 bags of Sand. Completed @ 1040, Installation of Bentonite Seal started @ 1041, 3 bags to 18.5' bgs, completed @ 1046, Grout installation began @ 1430 w/ 95% portland cement - 5% BenSeal powdered bentonite, grout to 2' bgs, completed @ 1500, Surface completion of 4'x4'x3" concrete pad, 8" steel well protector, and 3" steel bollards x4 started on 1/26/12 @ 1115, completed @ 1240

1/27/12 Partly cloudy Cool 34°F

Well Development 35BWW09 began @ 0750
TD 38.5 DTW 25.7, well volume = 2.32 gal
removed 3 bailers of water for initial evaluation @ 0802
Pumping from bottom of well to remove heavy sediments
@ 0810, pumped 3.5 gal from bottom of well
then surged the well with a Quater 4" surging
disc entire length of screen proceeding to remove
~~[illegible]~~ more sediment by pumping removed @ 0915
5 gallons, ~~M~~easured water Quality parameters
see Well Development record, Surged the
well, and pumped out 8.5 gal., proceeded
to evaluate parameters @ 1005, surging the
well another cycle @ 1015, starting to pump to
evacuate sediment @ 1030, pumped 8.5 gal,
surged another cycle complete @ 1100, evacuating
sediment by pumping @ 1105, Evaluating
* water quality @ 1115, surging @ 1120, pumping
@ 1145 SF to evaluate and remove sediment, Field
parameters stabilized @ 1145, Pumping 3
well volumes to confirm and finish developing
well. Well Developed @ 1215 total volume
pumped 68 gal.

2/8/12 1300

Well Development 35BWW14 @1305
TD 38.7 ft DTW 22.15 ft Well Volume 10.75 gal
Removed 3 bailers of water for initial evaluation
Surged & Pumped 1 cycle pumped out 15 gal
@ 1330 and evaluated. Starting 2nd Surge
& Pump cycle @ 1335 removed 16 gals *evaluated water quality
3rd Surge & pump begin 1355 removed 15 gals
evaluating water for stabilization @1410,
pumped a total of 63.5 gal.
stabilized @ 1444 on 2/8/12

2/8/12

Well Development

On well 35BWW11 @ 1535 for development TD 89.1 DTW 23.4 Well volume 10.2 gal

*Pumped 15 gals to evacuate sediment from bottom @ 1545

removed 3 bailers full for initial evaluation @ 1544 proceeding to surge & pump started 1st cycle @ 1547 pumped 10 gals, evaluated water pumped 25 gals, Started 2nd Surge & pump cycle @ 1618, pumped 10 gals evaluated water @ 1640, Started 3rd Surge & pump cycle @ 1648, pumped 10 gal, *Readings stabilized @ 1640, Pumped 35 gals @ 1715 Turbidity began clearing @ 1735 and proceeded to stablize @ 1758

Well Developed @ 1758

00119334

2/9/12

Sampling B5BWW14
Overwell @ 0820, began low flow
sampling @ 0822,
DTW 22.25' TD 38.3, Flow rate 150mL/min

Temp	Time	DTW	PH	SPCond	ORP	DO	Turb
10.23	0829	22.25	6.79	0.541	168	3.06	131
11.08	0831	22.25	7.03	0.528	151	3.04	127
11.34	0834	22.23	6.80	0.502	167	2.96	121
11.75	0837	22.25	7.12	0.569	157	2.92	107
11.77	0840	22.25	7.28	0.524	175	2.76	102
12.03	0843	22.25	7.40	0.573	157	2.71	96
12.11	0846	22.21	7.45	0.594	159	2.63	91
12.23	0849	22.24	7.40	0.584	163	2.71	89
12.28	0851	22.24	7.43	0.579	173	2.52	87
	0854						
	0857						

Sampled @ 0900
Total purged 1.8 gal.
Final DTW 22.25'

00119335

2/9/12

Final Depth 23.75

Sampling Well 35BWW11, on well @ 0920, low flow ~~Sampling~~ Pumping ST @ 0930

DTW 23.50 TD 39.1 Initial flow Rate 130 mL/min

*decreased flow Rate to 80 mL/min

Sampled @ 1027 purged 0.6 gal

ST Temp °C	Time	DTW	pH	mS/cm SCond	ORP	DO	Turb
13.38	0934	23.64	6.28	1.13	35	3.25	283
12.73	0937	23.68	6.32	1.21	33	2.11	>1000
11.64	0940	23.70	6.31	1.29	24	1.24	>1000
12.54	0943	23.72	6.31	1.27	22	1.52	231
11.82	0946	23.75	6.37	1.20	21	2.36	275
12.00	0949	23.80*	6.55	0.971	21	2.92	290
12.23	0951	23.78	6.53	0.875	22	3.46	262
12.13	0954	23.78	6.56	0.752	22	3.33	260
12.17	0957	23.78	6.59	0.674	22	3.67	245
12.05	1000	23.78	6.59	0.641	24	3.58	243
12.22	1003	23.78	6.59	0.625	26	3.62	239
12.36	1006	23.78	6.54	0.600	35	3.87	270
12.25	1009	23.78	6.61	0.584	39	4.47	>1000
11.54	1012	23.78	6.91	0.381	25	7.57	>1000
11.41	1015	23.78	6.77	0.579	39	5.77	>1000
11.23	1018	23.75	6.70	0.573	41	5.63	>1000
11.16	1021	23.75	6.72	0.570	43	5.45	>1000
11.15	1024	23.75	6.70	0.569	43	5.65	>1000

2/9/12

Sampling 35BWW09, Ovo-well @ 1040
Low flow pumping @ 1044,
DTW 25.5 TD 38.5 Flow Rate 120 ml/Min
Sampled @ ~~[illegible]~~ 1123 Volume purged 1.0 gal
Dup-1 collected @ 1128 from 35BWW09

time	DTW	Temp	pH	SCond	ORP	DO	Turb
1050	25.70	10.33	6.89	1.48	104	1.60	66.0
1053	25.68	10.82	6.94	1.47	93	1.54	56.4
1056	25.65	11.55	6.96	1.47	84	1.34	47.4
1059	25.65	12.02	6.97	1.47	79	1.15	34.1
1102	25.65	12.41	6.98	1.46	76	1.12	27.0
1105	25.65	12.49	6.99	1.46	73	1.08	19.3
1108	25.65	12.66	6.99	1.45	70	1.04	17.5
1111	25.65	12.97	6.99	1.46	65	0.93	7.1
1114	25.65	13.01	6.99	1.45	62	0.91	6.0
1117	25.65	13.07	6.99	1.44	60	0.90	5.7
1120	25.65	13.05	6.99	1.42	60	0.89	5.9

00119337

2/9/12

Sampling 35BWW04, over well @ 1140;
low-flow pumping @ 1144, Flow Rate 130 mL/min
DTW 22.85 TD 35.8
Sample time 1223 Volume Purged .5 gal

*slowed Rate to 80 mL/min @ 1157

Time	DTW	Temp °C	pH	SCond	ORP	DO	Turb
1151	23.04	15.18	6.87	0.347	133	5.13	77.3
1154	23.09	15.57	6.81	0.349	130	7.14	70.0
1157	23.10*	15.48	6.82	0.351	130	7.46	62.2
1200	23.10	15.57	6.82	0.350	130	6.99	52.2
1203	23.10	15.50	6.81	0.349	129	6.98	55.6
1206	23.10	15.48	6.82	0.351	129	6.97	45.9
1209	23.10	15.43	6.81	0.349	130	6.90	45.8
1212	23.10	15.41	6.81	0.348	131	6.93	42.4
1215	23.10	15.40	6.81	0.349	131	6.92	41.2
1218	23.10	15.39	6.81	0.348	130	6.99	41.5
1221	23.10	15.39	6.81	0.350	130	6.97	41.4

2/9/12

Sampling 35BWW08, over well @ 1225,
low flow pumping @ 1229, Flow Rate 160 mL/min
DTW 24.50 TD 34.6
Sampled @ 1308

Total Volume purged 0.75 gal

time	DTW	Temp°C	pH	SCond	ORP	DO	Turb
1238	24.50	14.86	7.58	0.819	168	2.94	0.0
1241	24.55	15.08	6.71	0.818	215	2.38	0.0
1244	24.50	15.18	6.75	0.808	229	2.29	0.0
1247	24.50	15.30	6.73	0.811	232	2.08	0.0
1250	24.50	15.45	6.75	0.810	247	1.77	0.0
1253	24.50	15.52	6.73	0.838	234	1.61	0.0
1256	24.50	15.55	6.79	0.811	246	1.35	0.0
1259	24.50	15.74	6.70	0.838	253	1.35	0.0
1302	24.50	15.81	6.70	0.829	253	1.31	0.0
1305	24.50	16.10	6.70	0.837	251	1.30	0.0

Samples Shipped Fed EX
on 2/9/12 @ ______
Tracking # 8757 0826 0722

APPENDIX D

Well Development Forms

Shaw®

Figure 1

WELL DEVELOPMENT RECORD

WELL/PIEZOMETER ID 35BWW09
SHEET 1 OF 1

PROJECT NAME: LHAAP PROJECT NO.: ______ DATE: 1/27/12

LOCATION: Karnack, TX DATE INSTALLED: 1/26/12

TOTAL DEPTH (FTOC) 38.5' CASING DIAMETER 4"

METHODS OF DEVELOPMENT

☐ Swabbing ☐ Bailing ☐ Pumping ☒ Surge & Pump

Describe ______

Equipment decontaminated prior to development ☐ Yes ☐ No

Describe Alconox rinse then 2X De-Ionized H_2O rinse

EQUIPMENT NUMBERS Horiba U-52 multi-meter

pH Meter ______ EC Meter ______ Turbidity Meter ______ Thermometer ______

CASING VOLUME INFORMATION:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

PURGING INFORMATION

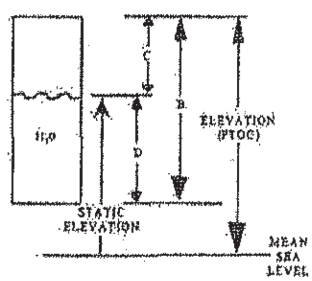
Measured Well Depth B 38.5 ft.

Measured Water Level Depth (C) 25.7 ft.

Length of Static Water Column (D) 38.5 (B) - 25.7 (C) = 12.8

Casing Water Volume (E) 0.65 (A) x 12.8 (D) = 8.32

Total Purge Volume = 8.32 gal



Date	Time	Water Level (FTOC)	Volume Removed (gal)	pH	EC	Temperature F or (C)	Turbidity/ Sand (ppm)	Comments
1/27	0802	25.7	1 bailer	6.69	1.37	16.61	Overrange	Very Dirty Sandy
1/27	0915	26.8	8.5	7.12	1.17	15.73	Overrange	>1000 NTU
1/27	1005	26.3	8.5	7.08	1.13	17.76	Overrange	>1000 NTU
1/27	1045	26.05	8.5	7.12	1.11	17.52	Overrange	>1000 NTU
1/27	1115	26.05	8.5	7.13	1.10	17.75	Overrange	>1000 NTU
1/27	1145	26.00	8.5	7.11	1.12	17.48	Overrange	>1000 NTU
1/27	1200	26.80	8.5	7.17	1.14	17.47	Overrange	>1000 NTU
1/27	1215	27.52	17	7.16	1.12	17.44	1000 NTU	

Stabilized (margin note bracketing rows 1005–1145)

Figure 1

WELL DEVELOPMENT RECORD

WELL/PIEZOMETER ID 35BWW11
SHEET _____ OF _____

PROJECT NAME: LHAAP PROJECT NO.: ______ DATE: 2/8/12

LOCATION: 35BWW11 DATE INSTALLED: 01/26/12

TOTAL DEPTH (FTOC) 39.1 CASING DIAMETER 4"

METHODS OF DEVELOPMENT

Describe Pump; Surge ☐ Swabbing ☐ Bailing ☐ Pumping ☑

Equipment decontaminated prior to development ☑ Yes ☐ No

Describe Wash in Alconox then double rinse in DI water

EQUIPMENT NUMBERS W-52

pH Meter ______ EC Meter ______ Turbidity Meter ______ Thermometer ______

CASING VOLUME INFORMATION:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

PURGING INFORMATION

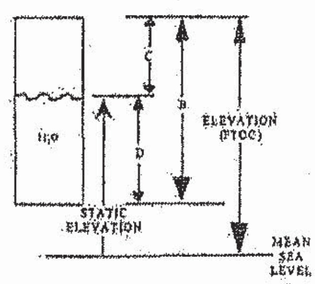
Measured Well Depth B 39.1 ft.

Measured Water Level Depth (C) 23.4 ft.

Length of Static Water Column (D) 39.1 (B) - 23.4 = 15.7

Casing Water Volume (E) 0.65 (A) x 15.7 (D) = 10.2

Total Purge Volume = 5 [illegible] 10.2 gal



Date	Time	Water Level (FTOC)	Volume Removed (gal)	pH	EC	Temperature F or C	Turbidity/ Sand (ppm)	Comments
2/8	1544	23.4	3 bailers	6.21	1.26	18.53	>1000	Cloudy full of sediment
2/8	1602	29.33	10 gal	6.41	1.13	18.03	>1000	Cloudy full of sediment
2/8	1613	29.54	2.5	6.42	1.08	19.52	>1000	" " "
2/8	1630	30.10	5	6.40	1.11	18.54	>1000	" " "
2/8	1640	31.2	5	6.49	1.09	19.51	>1000	" " "
2/8	1653	29.0	2.5	6.47	1.10	19.00	>1000	" " "
2/8	1705	29.45	7.5	6.42	1.14	19.36	>1000	clearing a little
2/8	1718	29.80	8	6.43	1.11	19.30	>1000	" "
2/8	1735	30.3	1	6.49	1.09	19.65	586	Clearing
2/8	1743	31.1	1	6.49	1.01	19.01	460	Clearing
2/8	1748	31.4	1	6.48	1.16	19.16	428	Clearing
2/8	1753	31.8	1	6.47	1.12	19.23	416	Clearing
2/8	1758	32.3	1	6.48	1.17	19.17	420	Clearing

(Margin notes: "stabilized" bracketing rows 1602–1640; "Stabilized including Turb." bracketing rows 1743–1758)

Figure 1

WELL DEVELOPMENT RECORD

WELL/PIEZOMETER ID________
SHEET ________ OF ________

PROJECT NAME: LHAAP PROJECT NO.: __________ DATE: 2/8/12

LOCATION: 35BWW14 DATE INSTALLED: 1/26/12

TOTAL DEPTH (FTOC) 38.7 CASING DIAMETER 4"

METHODS OF DEVELOPMENT

Describe Pump & Surge ☐ Swabbing ☐ Bailing ☐ Pumping ☑

Equipment decontaminated prior to development ☐ Yes ☐ No

Describe Alconox wash and double rinse in DI water

EQUIPMENT NUMBERS Horiba U52

pH Meter ________ EC Meter ________ Turbidity Meter ________ Thermometer ________

CASING VOLUME INFORMATION:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

PURGING INFORMATION

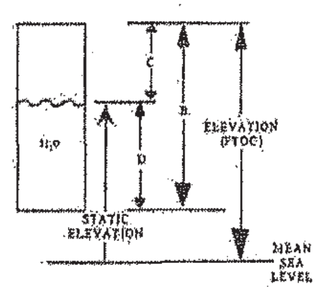
Measured Well Depth B 38.7 ft.

Measured Water Level Depth (C) 22.15 ft.

Length of Static Water Column (D) 38.7 (B) - 22.15 (C) = 16.55

Casing Water Volume (E) 0.65 (A) x 16.55 (D) = ______

Total Purge Volume = 10.75 gal



Date	Time	Water Level (FTOC)	Volume Removed (gal)	pH	EC	Temperature F or C	Turbidity/ Sand (ppm)	Comments
2/8	1305	22.15	3 bailers	7.75	0.944	16.79	>1000	full of sediment
2/8	1330	25.25	15 gal	7.44	0.773	17.38	>1000	full of sediment
2/8	1353	25.00	11 gal	7.10	0.729	18.09	>1000	full of sediment
2/8	1358	25.40	5 gal	7.05	0.625	18.30	>1000	full of sediment
2/8	1410	29.85	5 gal	6.86	0.748	18.03	>1000	starting to clear
2/8	1420	25.64	10 gal	6.86	0.580	18.14	>1000	cloudy
2/8	1427	25.88	5 gal	6.81	0.545	18.25	271	clearing
2/8	1433	26.08	5 gal	6.83	0.515	18.21	255	clearing
2/8	1438	25.14	5 gal	6.85	0.565	18.17	250	clearing
2/8	1444	~~26~~ 26.40	2.5 gal	6.83	0.545	18.01	245	clearing

Stabilized (bracketing last four rows); JF (initials below table)

APPENDIX E

Chain of Custody and Field Forms

00119344

Chain of Custody Record

TAL-4124-280 (0508)

Sampler ID ______

Temperature on Receipt 24 JA1 (mg 2/10)

Drinking Water? Yes ☐ No ☒

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client	CCRC
Project Manager	Dwayne Beavers
Date	2/9/11
Chain of Custody Number	150041
Address	10838 E Marshall St Suite 220
Telephone Number (Area Code)/Fax Number	(918) 431 2912 (918) 583 7948
Lab Number	Lisa Oriell
Page	1 of 1
City	Tulsa
State	OK
Zip Code	74116
Site Contact	Dwayne
Lab Contact	303-736-010
Project Name and Location (State)	Longhorn Ammunition Plant (LHAAP)
Carrier/Waybill Number	Federal Express
Contract/Purchase Order/Quote No.	

Special Instructions/ Conditions of Receipt

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	VOA	pH	Cyanide	Flash Pt.	Sulfate	TCLP lead
TB1	2/9/12	—		X									X					
FB1	2/9/12	0745		X									X					
35BWW14	2/9/12	0900		X									X					
35BWW11	2/9/12	1027		X									X					
35BWW09	2/9/12	1123		X									X					
Dup-1	2/9/12	1128		X									X					
35BWW04	2/9/12	1221		X									X					
IOW-1	2/9/12	1320		X							X		X	X	X	X	X	
IOW-2	2/9/12	1100				X							X	X	X	X	X	X
35BWW08	2/9/12	1308		X									X					

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☒ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☐ Return To Client ☒ Disposal By Lab ☒ Archive For 1 Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days ☒ Other Standard

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: D Beavers	2/9/11	1420	1. Received By: [signature]	2/10/12	0900
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Figure 1

Water Level Measurement/Groundwater Sampling Log Form

Well No. 35BWW 11 Date 2/9/12

Sample ID No. 35BWW 11

Project ID LHAAP Measured/Sampled By: John Freise

Time: Start 0920 End: 1027

Measuring Point Elevation: ______ Ft. Well Construction Material: 4" PVC

Well Depth Ft: 1) 39.1' 2) ______ 3) ______ 4) ______

Avg. ______ (of valid measurements*)

Water Depth Ft: 1) 23.50' 2) ______ 3) ______ 4) ______

Avg. ______ (of valid measurements*)

(*Minimum of three measurements, last two within 0.01 feet.)

Well Internal Diameter: 4 ~~ft~~ in

Riser Above/Below Pad Elevation Marker: ______ Ft.

Pad Elevation: ______ Ft.

Sampling Equipment Used:
Horiba U52, Cole-Parmer Peristaltic Pump, Teflon tubing

Equipment Numbers: U52 # B32C3AVR

pH Meter ______ EC Meter ______ Turbidity Meter ______ Thermometer ______

Casing Volume Information:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Purging Information:

Measured Well Depth (B): 39.1 Ft.

Measured Water Level Depth (C): 23.5 Ft.

Length of Static Water Column (D): 39.1 (B) - 23.5 (C) = 15.6 ft.

Casing Water Volume (E): 0.65 (A) x 15.6 (D) = 10.14 gal.

Total Purge Volume = 0.6 (gal) (minimum of three casing volumes)

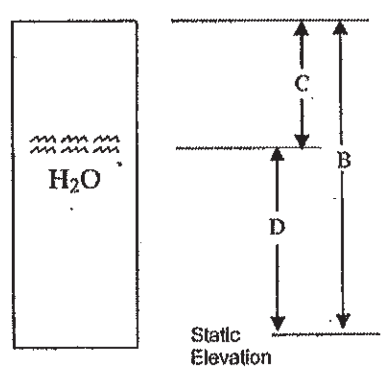


Figure 1 (*continued*)

Water Level Measurement/Groundwater Sampling Log Form (Continued)

Field Indicator Parameter Measurements During Purging:

pH	6.77	6.70	6.72	6.70	
Temp.°C	~~[illegible]~~ 11.41	11.23	11.16	11.15	
Specific Conductance: ~~µmhos~~ mS/cm		0.579	0.573	0.570	0.569
Turbidity: NTU		>1000	>1000	>1000	>1000
Visual Appearance of Water:		Cloudy	Cloudy	Cloudy	Cloudy

Comments:

Field Indicator Parameter Measurements After Sampling:

pH	6.71			
Temp.°C	11.28			
Specific Conductance: ~~µmhos~~ mS/cm	0.571			
Turbidity: NTU	>1000			
Visual Appearance of Water:	Cloudy			

Comments:

Laboratory Analysis Requested:

Sample ID No.	Parameter	Method	Preservation	Duplicate	No. of Containers
35BWW11	VOC	8260B	HCl	N	3

Figure 2

Shaw Environmental & Infrastructure, Inc.	WATER SAMPLE FIELD COLLECTION REPORT	Project Number: ____ Project Name: ____ Site Location: LHAAP

Sample ID Number	35BWW11	Date Collected	2/9/12
Sample Location(7)	35BWW11	Time Collected	1027
Diameter of Well	4 (in.)	Sampler	I.D. # JF
Depth to Bottom of Well	39.1 (ft.)	Casing Stick Up	4.1'
Static Water Level	23.50 (ft.)	Measured From(1)	TOC (ft.)
Well Volumes Purged		Purging Method(2)	Pumped
Type of Sample(3)	Well	Sampling Method(4)	Low-flow Pumping
Depth of Sample	34. (ft.)	Measured From(1)	TOC
Sample Collection Order			

FIELD SCREENING AND TEST RESULTS

Water Temperature 11.15 °C pH 6.70 Units

Specific Conductance 0.569 ~~umho~~ mS/cm at 11.15 °C

OVA ☐ HNU PID ☐ Reading ______ PPM

Photovac GC (P/GC) Probable Compound ______ Reading ______ PPM

METER CALIBRATION

pH STD	METER READING	SP. COND. STD	METER READING	____/STD (8)	METER READING

SAMPLE TYPES COLLECTED

CONTAINER #	TYPE (5)	CONTAINER TYPE	VOLUME	FILTERED	
	VOA	P ☐ G ☑	40 mL	Y ☐ N ☑	Y ____ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y ____ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y ____ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y ____ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y ____ N ☐

WEATHER CONDITIONS: TEMP. 50 °F CLEAR ☑ CLOUDY ☐ RAIN ☐ SNOW ☐ WINDY ☐

(1) T.O.C. = Top of Protective Casing; T.O.W. = Top of Well Casing; G.S. = Ground Surface
(2) Bailed, Pumped, Air Lift, Etc.
(3) Stream, Pond, Spring, Well, Seep, Supply, Etc.
(4) Bailer, Kemmerer, Grab, Pump, Etc.
(5) General Chem., Metal, VOA, Organics, Etc.
(6) HNO^3, NaOH, H^2SO^4, $Na^2O^3S^2$, Etc.
(7) If Well, give Well I.D. Number.
(8) OVA, PID, P/GC or Other.

Figure 1

Water Level Measurement/Groundwater Sampling Log Form

Well No. 35BWW09 Date 2/9/12
Sample ID No. 35BWW09
Project ID LHAAP Measured/Sampled By: John Freise
Time: Start 1040 End: 1128

Measuring Point Elevation: ______ Ft. Well Construction Material: 4" PVC
Well Depth Ft: 1) 38.5 2) ______ 3) ______ 4) ______
Avg. ______ (of valid measurements*)

Water Depth Ft: 1) 25.5 2) ______ 3) ______ 4) ______
Avg. ______ (of valid measurements*)
(*Minimum of three measurements, last two within 0.01 feet.)

Well Internal Diameter: 4 ~~Ft.~~ In.
Riser Above/Below Pad Elevation Marker: ______ Ft.

Pad Elevation: ______ Ft.
Sampling Equipment Used:
Horiba U-52, Cole-Parmer Peristaltic Pump, Teflon Tubing

Equipment Numbers: U-52 #BJ2C3AVR
pH Meter ______ EC Meter ______ Turbidity Meter ______ Thermometer ______

Casing Volume Information:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Purging Information:
Measured Well Depth (B): 38.5 Ft.
Measured Water Level Depth (C): 25.5 Ft.
Length of Static Water Column (D): 38.5 (B) - 25.5 (C) = 13 ft.
Casing Water Volume (E): 0.65 (A) x 13 (D) = 8.45 gal.
Total Purge Volume = 1.0 (gal) (minimum of three casing volumes)

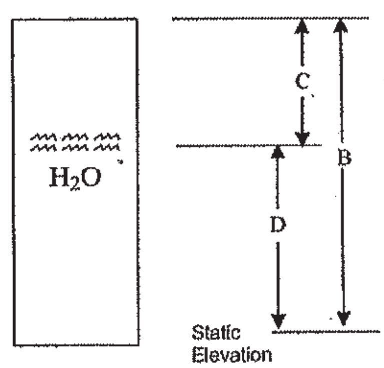


Figure 1 (*continued*)

Water Level Measurement/Groundwater Sampling Log Form (Continued)

Field Indicator Parameter Measurements During Purging:

pH	6.99	6.99	6.99	6.99	
Temp.°C	12.97	13.01	13.07	13.05	
Specific Conductance: ~~μmhos~~ mS/cm		1.46	1.45	1.44	1.42
Turbidity: NTU		7.1	6.0	5.7	5.9
Visual Appearance of Water:		Clear	Clear	Clear	Clear

Comments:

Field Indicator Parameter Measurements After Sampling:

pH	6.99			
Temp.°C	13.01			
Specific Conductance: ~~μmhos~~ mS/cm	1.44			
Turbidity: NTU	5.5			
Visual Appearance of Water:	Clear			

Comments:

Laboratory Analysis Requested:

Sample ID No.	Parameter	Method	Preservation	Duplicate	No. of Containers
35BWW09	VOC	8260B	HCl	Y	6*

*3 for Sample
3 for Dup

Figure 2

Shaw Environmental & Infrastructure, Inc.	WATER SAMPLE FIELD COLLECTION REPORT	Project Number: ____ Project Name: ____ Site Location: LHAAP

Sample ID Number	35BWW09	Date Collected	2/9/12
Sample Location[7]	35BWW09	Time Collected	1123 ; 1128
Diameter of Well	4 (in.)	Sampler	I.D. # SF
Depth to Bottom of Well	38.5 (ft.)	Casing Stick Up	3
Static Water Level	25.5 (ft.)	Measured From[1]	TOC (ft.)
Well Volumes Purged		Purging Method[2]	Pump
Type of Sample[3]		Sampling Method[4]	Low flow Pumping
Depth of Sample	33. (ft.)	Measured From[1]	TOC
Sample Collection Order			

FIELD SCREENING AND TEST RESULTS

Water Temperature 13.05 °C pH 6.99 Units

Specific Conductance 1.42 ~~umho~~ mS/cm at 13.05 °C

OVA ☐ HNU PID ☐ Reading ____ PPM

Photovac GC (P/GC) Probable Compound ____ Reading ____ PPM

METER CALIBRATION

pH STD	METER READING	SP. COND. STD	METER READING	____/STD (8)	METER READING

SAMPLE TYPES COLLECTED

CONTAINER #	TYPE (5)	CONTAINER TYPE		VOLUME	FILTERED			
		P ☐	G ☑	40 mL	Y ☐	N ☑	Y	N ☐
	VOA	P ☐	G ☑	40 mL	Y ☐	N ☑	Y	N ☐
Dup-1	VOA	P ☐	G ☐	40 mL	Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐

WEATHER CONDITIONS: TEMP. 50 °F CLEAR ☑ CLOUDY ☐ RAIN ☐ SNOW ☐ WINDY ☐

(1) T.O.C. = Top of Protective Casing; T.O.W. = Top of Well Casing; G.S. = Ground Surface
(2) Bailed, Pumped, Air Lift, Etc.
(3) Stream, Pond, Spring, Well, Seep, Supply, Etc.
(4) Bailer, Kemmerer, Grab, Pump, Etc.
(5) General Chem., Metal, VOA, Organics, Etc.
(6) HNO^3, NaOH, H^2SO^4, $Na^2O^3S^2$, Etc.
(7) If Well, give Well I.D. Number.
(8) OVA, PID, P/GC or Other.

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Figure 1

Water Level Measurement/Groundwater Sampling Log Form

Well No. 35BWW08 Date 2/9/12
Sample ID No. 35BWW08
Project ID LHAAP Measured/Sampled By: John Freise
Time: Start 1225 End: 1308

Measuring Point Elevation: ______ Ft. Well Construction Material: 2" PVC
Well Depth Ft: 1) 34.6 2) ______ 3) ______ 4) ______
Avg. ______ (of valid measurements*)

Water Depth Ft: 1) 24.5 2) ______ 3) ______ 4) ______
Avg. ______ (of valid measurements*)
(*Minimum of three measurements, last two within 0.01 feet.)

Well Internal Diameter: 2 ~~Ft.~~ In
Riser Above/Below Pad Elevation Marker: ______ Ft.

Pad Elevation: ______ Ft.
Sampling Equipment Used:
Horiba U-52 Multi Meter, Cole-Parmer Peristaltic Pump, Teflon tubing

Equipment Numbers: U-52 #B52C3AVR
pH Meter ______ EC Meter ______ Turbidity Meter ______ Thermometer ______

Casing Volume Information:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Purging Information:
Measured Well Depth (B): 34.6 Ft.
Measured Water Level Depth (C): 24.5 Ft.
Length of Static Water Column (D): 34.6 (B) - 24.5 (C) = 10.1 ft.
Casing Water Volume (E): 0.16 (A) x 10.1 (D) = 1.6 gal.
Total Purge Volume = 0.75 (gal) (minimum of three casing volumes)

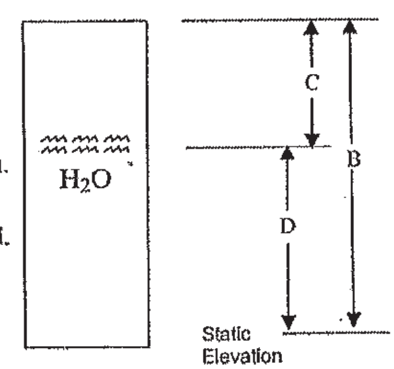

Figure 1 (*continued*)

Water Level Measurement/Groundwater Sampling Log Form (Continued)

Field Indicator Parameter Measurements During Purging:

pH	6.79	6.70	6.70	6.70	
Temp.°C	15.55	15.74	15.81	16.10	
Specific Conductance: ~~µmhos~~ mS/cm		0.811	0.838	0.829	0.837
Turbidity: NTU		0	0	0	0
Visual Appearance of Water:		clear	clear	clear	clear

Comments:

Field Indicator Parameter Measurements After Sampling:

pH	6.70			
Temp.°C	16.11			
Specific Conductance: µmhos/cm	0.830			
Turbidity: NTU	0			
Visual Appearance of Water:	Clear			

Comments:

Laboratory Analysis Requested:

Sample ID No.	Parameter	Method	Preservation	Duplicate	No. of Containers
35BWW08	VOC	8260B	HCl	N	3

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Figure 2

Shaw Environmental & Infrastructure, Inc.	WATER SAMPLE FIELD COLLECTION REPORT	Project Number: ___ Project Name: ___ Site Location: LHAAP

Sample ID Number	35BWW08	Date Collected	2/9/12
Sample Location(7)	35BWW08	Time Collected	1308
Diameter of Well	2 (in.)	Sampler	I.D. # JF
Depth to Bottom of Well	34.6 (ft.)	Casing Stick Up	3
Static Water Level	24.5 (ft.)	Measured From(1)	TOC (ft.)
Well Volumes Purged		Purging Method(2)	Pump
Type of Sample(3)	Well	Sampling Method(4)	Low-flow Pumping
Depth of Sample	29. (ft.)	Measured From(1)	TOC
Sample Collection Order			

FIELD SCREENING AND TEST RESULTS

Water Temperature 16.10 °C pH 6.70 Units

Specific Conductance 0.837 ~~umho~~ mS/cm at 16.10 °C

OVA ☐ HNU PID ☐ Reading ______ PPM

Photovac GC (P/GC) Probable Compound ______ Reading ______ PPM

METER CALIBRATION

pH STD	METER READING	SP. COND. STD	METER READING	______/STD (8)	METER READING

SAMPLE TYPES COLLECTED

CONTAINER #	TYPE (5)	CONTAINER TYPE		VOLUME	FILTERED			
	VOA	P ☐	G ☑	40 mL	Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐

WEATHER CONDITIONS: TEMP. 50 °F CLEAR ☑ CLOUDY ☐ RAIN ☐ SNOW ☐ WINDY ☐

(1) T.O.C. = Top of Protective Casing; T.O.W. = Top of Well Casing; G.S. = Ground Surface
(2) Bailed, Pumped, Air Lift, Etc.
(3) Stream, Pond, Spring, Well, Seep, Supply, Etc.
(4) Bailer, Kemmerer, Grab, Pump, Etc.
(5) General Chem., Metal, VOA, Organics, Etc.
(6) HNO^3, NaOH, H^2SO^4, $Na^2O^3S^2$, Etc.
(7) If Well, give Well I.D. Number.
(8) OVA, PID, P/GC or Other.

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Document:	GW Sampling
Revision Date:	11/03/05
Revision No.:	0
Page:	14 of 16

Figure 1

Water Level Measurement/Groundwater Sampling Log Form

Well No. 35BWW04 Date 2/9/12
Sample ID No. 35BWW04
Project ID LHAAP Measured/Sampled By: John Freise
Time: Start 1140 End: 1221

Measuring Point Elevation: ______ Ft. Well Construction Material: 4" PVC
Well Depth Ft: 1) 35.8 2) ______ 3) ______ 4) ______
Avg. ______ (of valid measurements*)

Water Depth Ft: 1) 22.85 2) ______ 3) ______ 4) ______
Avg. ______ (of valid measurements*)
(*Minimum of three measurements, last two within 0.01 feet.)

Well Internal Diameter: 4 ~~Ft.~~ In.
Riser Above/Below Pad Elevation Marker: ______ Ft.

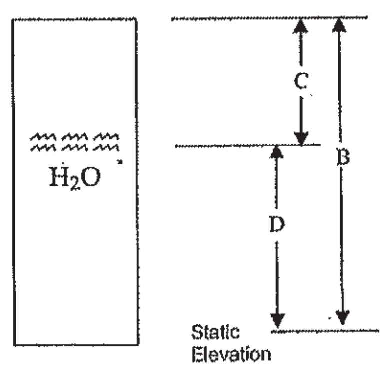
Pad Elevation: ______ Ft.
Sampling Equipment Used:
Horiba U-52 multimeter, Cole-Parmer Peristaltic Pump, Teflon Tubing

Equipment Numbers: U-52 #B52C3AVR
pH Meter ______ EC Meter ______ Turbidity Meter ______ Thermometer ______

Casing Volume Information:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Purging Information:
Measured Well Depth (B): 35.8 Ft.
Measured Water Level Depth (C): 22.85 Ft.
Length of Static Water Column (D): 35.8 - 22.85 = 12.95 ft.
: (B) - (C) =
Casing Water Volume (E): 0.65 x 12.95 = 8.4 gal.
(A) x (D) =
Total Purge Volume = 0.5 (gal) (minimum of three casing volumes)



These standard project procedures are applicable to all members of Shaw Environmental, Inc.

Figure 1 (*continued*)

Water Level Measurement/Groundwater Sampling Log Form (Continued)

Field Indicator Parameter Measurements During Purging:

pH	6.81	6.81	6.81	6.81	
Temp.°C	15.41	15.40	15.39	15.39	
Specific Conductance: ~~µmhos~~ mS/cm		0.348	0.349	0.348	0.350
Turbidity: NTU		42.4	41.2	41.5	41.4
Visual Appearance of Water:		Clear	Clear	Clear	Clear

Comments:

Field Indicator Parameter Measurements After Sampling:

pH	6.81			
Temp.°C	15.37			
Specific Conductance: ~~µmhos~~ mS/cm	0.351			
Turbidity: NTU	40.7			
Visual Appearance of Water:	Clear			

Comments:

Laboratory Analysis Requested:

Sample ID No.	Parameter	Method	Preservation	Duplicate	No. of Containers
35BWW04	VOC	8260B	HCl	N	3

Figure 2

Shaw Environmental & Infrastructure, Inc.	WATER SAMPLE FIELD COLLECTION REPORT	Project Number: ____ Project Name: ____ Site Location: LHAAP

Sample ID Number	35BWW04	Date Collected	2/9/12
Sample Location[7]	35BWW04	Time Collected	1221
Diameter of Well	4 (in.)	Sampler	I.D. # JF
Depth to Bottom of Well	35.8 (ft.)	Casing Stick Up	3
Static Water Level	22.85 (ft.)	Measured From[1]	TOC (ft.)
Well Volumes Purged		Purging Method[2]	Pump
Type of Sample[3]	Well	Sampling Method[4]	Low-flow Pumping
Depth of Sample	30. (ft.)	Measured From[1]	TOC
Sample Collection Order			

FIELD SCREENING AND TEST RESULTS

Water Temperature 15.39 °C pH 6.81 Units

Specific Conductance 0.350 ~~umho~~ mS/cm at 15.39 °C

OVA ☐ HNU PID ☐ Reading ____ PPM

Photovac GC (P/GC) Probable Compound ____ Reading ____ PPM

METER CALIBRATION

pH STD	METER READING	SP. COND. STD	METER READING	____/STD (8)	METER READING

SAMPLE TYPES COLLECTED

CONTAINER #	TYPE (5)	CONTAINER TYPE		VOLUME	FILTERED			
		P ☐	G ☑		Y ☐	N ☑	Y	N ☐
	VOA	P ☐	G ☐	40 mL	Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐
		P ☐	G ☐		Y ☐	N ☐	Y	N ☐

WEATHER CONDITIONS: TEMP. 50 °F CLEAR ☑ CLOUDY ☐ RAIN ☐ SNOW ☐ WINDY ☐

(1) T.O.C. = Top of Protective Casing; T.O.W. = Top of Well Casing; G.S. = Ground Surface
(2) Bailed, Pumped, Air Lift, Etc.
(3) Stream, Pond, Spring, Well, Seep, Supply, Etc.
(4) Bailer, Kemmerer, Grab, Pump, Etc.
(5) General Chem., Metal, VOA, Organics, Etc.
(6) HNO^3, NaOH, H^2SO^4, $Na^2O^3S^2$, Etc.
(7) If Well, give Well I.D. Number.
(8) OVA, PID, P/GC or Other.

Figure 1

Water Level Measurement/Groundwater Sampling Log Form

Well No. 35BWW14 Date 2/9/12

Sample ID No. 35BWW14

Project ID LHAAP Measured/Sampled By: John Freise

Time: Start 0820 End: 0900

Measuring Point Elevation: ______ Ft. Well Construction Material: 4" PVC

Well Depth Ft: 1) 38.3' 2) ______ 3) ______ 4) ______

Avg. ______ (of valid measurements*)

Water Depth Ft: 1) 22.25' 2) ______ 3) ______ 4) ______

Avg. ______ (of valid measurements*)

(*Minimum of three measurements, last two within 0.01 feet.)

Well Internal Diameter: 4 ~~ft~~ in

Riser Above/Below Pad Elevation Marker: ______ Ft.

Pad Elevation: ______ Ft.

Sampling Equipment Used:
Horiba U-52 Multimeter, Cole-Parmer Peristaltic Pump, teflon tubing

Equipment Numbers: U-52 #BJ2C3AVR

pH Meter ______ EC Meter ______ Turbidity Meter ______ Thermometer ______

Casing Volume Information:

Casing ID (inch)	1.0	1.5	2.0	2.2	3.0	4.0	4.3	5.0	6.0	7.0	8.0
Unit Casing Volume (A) (gal/ft)	0.04	0.09	0.16	0.2	0.37	0.65	0.75	1.0	1.5	2.0	2.6

Purging Information:

Measured Well Depth (B): 38.3 Ft.

Measured Water Level Depth (C): 22.25 Ft.

Length of Static Water Column (D): 38.3 (B) - 22.25 (C) = 16.05 ft.

Casing Water Volume (E): 0.65 (A) x 16.05 (D) = 10.4 gal.

Total Purge Volume = 1.8 (gal) (minimum of three casing volumes)

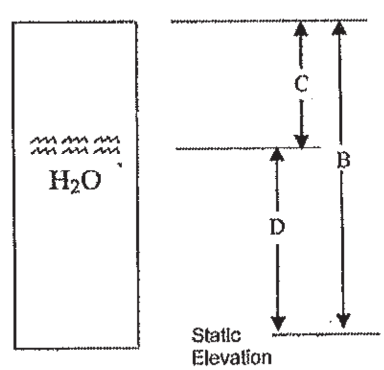


Figure 1 (*continued*)

Water Level Measurement/Groundwater Sampling Log Form (Continued)

Field Indicator Parameter Measurements During Purging:

pH	7.40	7.45	7.40	7.43	
Temp.°C	~~22.2~~ 12.03	12.11	12.23	12.28	
Specific Conductance: ~~µmhos~~ mS/cm		0.573	0.594	0.584	0.579
Turbidity: NTU		96	91	89	87
Visual Appearance of Water:					

Comments:

Field Indicator Parameter Measurements After Sampling:

pH	7.43			
Temp.°C	12.30			
Specific Conductance: ~~µmhos~~ mS/cm	0.581			
Turbidity: NTU	80			

Visual Appearance of Water:

Comments:

Laboratory Analysis Requested:

Sample ID No.	Parameter	Method	Preservation	Duplicate	No. of Containers
35BWW14	VOC	8260B	HCl	N	3

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Figure 2

Shaw® Shaw Environmental & Infrastructure, Inc.	WATER SAMPLE FIELD COLLECTION REPORT	Project Number: ______ Project Name: ______ Site Location: LHAAP

Sample ID Number	35Bww14	Date Collected	2/9/12
Sample Location[7]	35Bww14	Time Collected	0900
Diameter of Well	4 (in.)	Sampler	I.D. # SF
Depth to Bottom of Well	38.3 (ft.)	Casing Stick Up	3'
Static Water Level	22.25 (ft.)	Measured From[1]	(ft.)
Well Volumes Purged		Purging Method[2]	Pumped
Type of Sample[3]	Well	Sampling Method[4]	Low Flow Pump
Depth of Sample	33 (ft.)	Measured From[1]	TOC
Sample Collection Order			

FIELD SCREENING AND TEST RESULTS

Water Temperature 12.28 °C pH 7.43 Units

Specific Conductance 0.579 ~~umho~~ mS/cm at 12.28 °C

OVA ☐ HNU PID ☐ Reading ______ PPM

Photovac GC (P/GC) Probable Compound ______ Reading ______ PPM

METER CALIBRATION

pH STD	METER READING	SP. COND. STD	METER READING	______/STD (8)	METER READING

SAMPLE TYPES COLLECTED

CONTAINER #	TYPE (5)	CONTAINER TYPE	VOLUME	FILTERED	
	VOA	P ☐ G ☑	40 mL	Y ☐ N ☑	Y ______ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y ______ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y ______ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y ______ N ☐
		P ☐ G ☐		Y ☐ N ☐	Y N ☐

WEATHER CONDITIONS: TEMP. 40 °F CLEAR ☑ CLOUDY ☐ RAIN ☐ SNOW ☐ WINDY ☐

(1) T.O.C. = Top of Protective Casing; T.O.W. = Top of Well Casing; G.S. = Ground Surface
(2) Bailed, Pumped, Air Lift, Etc.
(3) Stream, Pond, Spring, Well, Seep, Supply, Etc.
(4) Bailer, Kemmerer, Grab, Pump, Etc.
(5) General Chem., Metal, VOA, Organics, Etc.
(6) HNO^3, NaOH, H^2SO^4, $Na^2O^3S^2$, Etc.
(7) If Well, give Well I.D. Number.
(8) OVA, PID, P/GC or Other.

APPENDIX F

Sampling Results Summary

SAMPLE SUMMARY

Client: Cherokee CRC LLC

Job Number: 280-25498-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
280-25498-1TB	TB1	Water	02/09/2012 0745	02/10/2012 0900
280-25498-2FB	FB1	Water	02/09/2012 0745	02/10/2012 0900
280-25498-3	35BWW14	Water	02/09/2012 0900	02/10/2012 0900
280-25498-4	35BWW11	Water	02/09/2012 1027	02/10/2012 0900
280-25498-5	35BWW09	Water	02/09/2012 1123	02/10/2012 0900
280-25498-6FD	DUP-1	Water	02/09/2012 1128	02/10/2012 0900
280-25498-7	35BWW04	Water	02/09/2012 1221	02/10/2012 0900
280-25498-8	IDW-1	Water	02/09/2012 1320	02/10/2012 0900
280-25498-9	IDW-2	Solid	02/09/2012 1100	02/10/2012 0900
280-25498-10	35BWW08	Water	02/09/2012 1308	02/10/2012 0900

EXECUTIVE SUMMARY - Detections

Client: Cherokee CRC LLC   Job Number: 280-25498-1

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-25498-1TB	**TB1**					
Methylene Chloride		0.90	J	5.0	ug/L	8260B/DoD
280-25498-2FB	**FB1**					
Methylene Chloride		0.62	J	5.0	ug/L	8260B/DoD
280-25498-3	**35BWW14**					
1,1-Dichloroethane		2.8		2.0	ug/L	8260B/DoD
1,1-Dichloroethene		29		2.0	ug/L	8260B/DoD
cis-1,2-Dichloroethene		7.6		2.0	ug/L	8260B/DoD
Methylene Chloride		1.5	J	10	ug/L	8260B/DoD
trans-1,2-Dichloroethene		0.36	J	2.0	ug/L	8260B/DoD
Tetrachloroethene		10		2.0	ug/L	8260B/DoD
1,2-Dichloroethene, Total		7.9		2.0	ug/L	8260B/DoD
Trichloroethene		63		2.0	ug/L	8260B/DoD
Vinyl chloride		2.6	J	3.0	ug/L	8260B/DoD
280-25498-4	**35BWW11**					
Methylene Chloride		0.60	J	5.0	ug/L	8260B/DoD
Tetrachloroethene		0.26	J	1.0	ug/L	8260B/DoD
280-25498-5	**35BWW09**					
1,1-Dichloroethene		0.30	J	2.0	ug/L	8260B/DoD
cis-1,2-Dichloroethene		0.43	J	2.0	ug/L	8260B/DoD
Methylene Chloride		1.2	J	10	ug/L	8260B/DoD
1,2-Dichloroethene, Total		0.43	J	2.0	ug/L	8260B/DoD
Trichloroethene		68		2.0	ug/L	8260B/DoD
280-25498-6FD	**DUP-1**					
1,1-Dichloroethene		0.29	J	2.0	ug/L	8260B/DoD
cis-1,2-Dichloroethene		0.38	J	2.0	ug/L	8260B/DoD
Methylene Chloride		1.3	J	10	ug/L	8260B/DoD
1,2-Dichloroethene, Total		0.38	J	2.0	ug/L	8260B/DoD
Trichloroethene		68		2.0	ug/L	8260B/DoD

EXECUTIVE SUMMARY - Detections

Client: Cherokee CRC LLC

Job Number: 280-25498-1

Lab Sample ID / Analyte	Client Sample ID	Result	Qualifier	Reporting Limit	Units	Method
280-25498-7	**35BWW04**					
1,1-Dichloroethane		0.57	J	1.0	ug/L	8260B/DoD
1,1-Dichloroethene		1.7		1.0	ug/L	8260B/DoD
cis-1,2-Dichloroethene		0.51	J	1.0	ug/L	8260B/DoD
Methylene Chloride		0.62	J	5.0	ug/L	8260B/DoD
Tetrachloroethene		17		1.0	ug/L	8260B/DoD
1,2-Dichloroethene, Total		0.51	J	1.0	ug/L	8260B/DoD
Trichloroethene		5.9		1.0	ug/L	8260B/DoD
280-25498-8	**IDW-1**					
1,1-Dichloroethane		0.90	J	1.0	ug/L	8260B/DoD
1,1-Dichloroethene		7.0		1.0	ug/L	8260B/DoD
1,2,4-Trimethylbenzene		8.9		1.0	ug/L	8260B/DoD
1,3,5-Trimethylbenzene		3.7		1.0	ug/L	8260B/DoD
4-Isopropyltoluene		0.37	J	1.0	ug/L	8260B/DoD
Chloroform		0.21	J	1.0	ug/L	8260B/DoD
cis-1,2-Dichloroethene		2.6		1.0	ug/L	8260B/DoD
Ethylbenzene		1.6		1.0	ug/L	8260B/DoD
Isopropylbenzene		0.20	J	1.0	ug/L	8260B/DoD
Methylene Chloride		0.56	J	5.0	ug/L	8260B/DoD
m-Xylene & p-Xylene		7.2		2.0	ug/L	8260B/DoD
Naphthalene		3.7		1.0	ug/L	8260B/DoD
n-Butylbenzene		0.32	J	1.0	ug/L	8260B/DoD
N-Propylbenzene		0.46	J	1.0	ug/L	8260B/DoD
o-Xylene		7.7		1.0	ug/L	8260B/DoD
Tetrachloroethene		2.6		1.0	ug/L	8260B/DoD
1,2-Dichloroethene, Total		2.6		1.0	ug/L	8260B/DoD
Trichloroethene		33		1.0	ug/L	8260B/DoD
Vinyl chloride		0.61	J	1.5	ug/L	8260B/DoD
Flashpoint		>160		1.00	Degrees F	1010A
pH		7.3	HF	0.10	SU	9040C
280-25498-9	**IDW-2**					
Methylene Chloride		0.95	J	5.6	ug/Kg	8260B/DoD
Tetrachloroethene		2.1	J	5.6	ug/Kg	8260B/DoD
Trichloroethene		0.63	J	5.6	ug/Kg	8260B/DoD
Ignitability		NO			No Unit	7.1.2
Percent Moisture		21		0.10	%	Moisture
Soluble						
pH-Soluble		6.7		0.010	SU	9045D

EXECUTIVE SUMMARY - Detections

Client: Cherokee CRC LLC

Job Number: 280-25498-1

Lab Sample ID Client Sample ID Analyte	Result	Qualifier	Reporting Limit	Units	Method
280-25498-10 35BWW08					
1,1-Dichloroethene	0.22	J	1.0	ug/L	8260B/DoD
cis-1,2-Dichloroethene	0.30	J	1.0	ug/L	8260B/DoD
Methylene Chloride	0.58	J	5.0	ug/L	8260B/DoD
1,2-Dichloroethene, Total	0.30	J	1.0	ug/L	8260B/DoD
Trichloroethene	37		1.0	ug/L	8260B/DoD

APPENDIX G

Waste Profiles and Manifest

Stericycle® Specialty Waste Solutions

WASTE PROFILE FORM

PROFILE # ____________

1. Generator Information

Name	United States Army Corps of Engineers Tulsa District 1645 S. 101st E. Ave. Tulsa, OK 74128
Contact	Aaron Williams
Site	Longhorn Army Ammunition Plant LHAAP-37
Phone	918-669-4915
EPA ID	

2. Billing Information

Name	Cherokee CRC 10838 E. Marshall Suite 220 Tulsa, OK 74116
Contact	John Freise
Phone/Fax	918-430-3456
Email	john.freise@cherokee-crc.com

Generator Status: CESQG ☐ SQG ☐ LQG ☐

3. Waste Description

Common Name of Waste	IDW waste soil
Process Generating Waste	Monitoring well installation

Color		Layers		Odor/Strength		State @ 70*	solid		
Free Liquid		% Liquid	21%	% Solids	79%	% Sludge		% Solubility	
% Total Halogens									

4. DOT Shipping Name: (include PG, UN/NA & Haz Class)

Non-Hazardous Waste

None ☐ Lab Pack ☐

*NOS Descriptor	
Quantity	10 55 gal, Frequency:
Shipment Method	Price Units:
EPA Codes	
State Codes	

5. Regulatory Status (check all that apply)

- Hazardous Waste per 40 CFR 261 ☐
- CESQG per 40 CFR 261.5 ☐
- Universal Waste per 40 CFR 273 ☐
- Used Oil per 40 CFR 279 ☐
- State Regulated Waste ☐
- HHW per 40 CFR 261.4(b)(1) ☐
- TSCA per 40 CFR 761 ☐
- Non Hazardous Waste ☑
- Other Exempt Waste per 40 CFR 261 ☐

Describe:

Form Code: Source Code:

Specific Gravity		Viscosity	
Flash Point (*F)		pH	6.7
BTUs		PCBs	
Total Cyanides (ppm)	0.3	Total Sulfides (ppm)	0.63

Waste Composition: (List all haz and non-haz. constituents)

Constituent	%
	%
	%
	%
	%
	%
	%
	%

6. Hazardous and Chemical Properties

None	☑	Oxidizer	☐
Water Reactive	☐	Ignitable	☐
Shock Sensitive	☐	Medical Waste	☐
Air Reactive	☐	Dioxins	☐
Explosive	☐	Benzene NESHAP	☐
Pyrophoric	☐	Pesticide/Herbicide	☐
Reactive Cyanides	☐	Polymerizable	☐
Reactive Sulfides	☐	Radioactive	☐
Phenols	☐	Asbestos	☐

Customer Disposal Preference (if any):

7. Metals (Inorganic) None ☑ TCLP ☐ SCLP ☐ Generator Knowledge ☐

D004 Arsenic (5mg/l)		D011 Silver (5mg/l)		Manganese	
D005 Barium (100mg/l)		Aluminum		Molybdenum	
D006 Cadmium (1mg/l)		Antimony		Nickel	
D007 Chromium (5mg/l)		Beryllium		Thallium	
D008 Lead (5mg/l)		Cobalt		Tin	
D009 Mercury (0.2mg/l)		Copper		Zinc	
D010 Selenium (1mg/l)		Chromium			

8. Other Compounds (Organic) None ☑ TCLP ☐ SCLP ☐ Totals ☐ Generator Knowledge ☐

D012 Endrin		D023 o-Cresol		D033 Hexachlorobutadiene	
D013 Lindane		D024 m-Cresol		D035 Methyl ethyl ketone	
D014 Methoxychlor		D025 p-Cresol		D036 Nitrobenzene	
D015 Toxaphene		D026 Cresol		D037 Pentachlorophenol	
D016 2,4-D		D027 1,4-Dichlorobenzene		D038 Pyridine	
D017 2,4 5 TP (Silvex)		D028 1,2-Dichloroethane		D039 Tetrachloroethylene	
D018 Benzene		D029 1,1-Dichloroethylene		D040 Trichloroethylene	
D019 Carbon Tetrachloride		D030 2,4-Dinitrotoluene		D041 2,4,5-Trichlorophenol	
D020 Chlordane		D031 Heptachlor (& epoxide)		D042 2,4,6-Trichlorophenol	
D021 Chlorobenzene		D032 Hexachlorobenzene		D043 Vinyl chloride	
D022 Chloroform					

Generator Certification: I hereby certify that I have personally examined and am familiar with the above and attached description. To the best of my knowledge it is complete and accurate. No deliberate or willful omissions of composition or properties exist and all known or suspected hazards have been disclosed.

Name	John Freise	Title	Environmental Scientist
Signature	[signature]	Date	Friday, March 02, 2012

00119367

Stericycle® Specialty Waste Solutions

WASTE PROFILE FORM

PROFILE # ______________

1. Generator Information

Name	United States Army Corps of Engineers Tulsa District 1645 S. 101st E. Ave. Tulsa, OK 74128
Contact	Aaron Williams
Site	Longhorn Army Ammunition Plant LHAAP-37
Phone	918-669-4915
EPA ID	

2. Billing Information

Name	Cherokee CRC 10838 E. Marshall Suite 220 Tulsa, OK 74116
Contact	John Freise
Phone/Fax	918-430-3456
Email	john.freise@cherokee-crc.com

Generator Status: CESQG ☐ SQG ☐ LQG ☐

3. Waste Description

Common Name of Waste	IDW waste Water
Process Generating Waste	Monitoring well installation

Color: ____ Layers: ____ Odor/Strength: ____ State @ 70°: liquid

Free Liquid: 100% % Liquid: ____ % Solids: ____ % Sludge: ____ % Solubility: ____

% Total Halogens: ____

4. DOT Shipping Name: (include PG, UN/NA & Haz Class)

Non-Hazardous Waste

None ☐ Lab Pack ☐

*NOS Descriptor	
Quantity	5 55 gal / Frequency
Shipment Method	Price Units
EPA Codes	
State Codes	

Specific Gravity		Viscosity	
Flash Point (°F)	>160	pH	7.3
BTUs		PCBs	
Total Cyanides (ppm)	0.002	Total Sulfides (ppm)	1.3

Waste Composition: (List all haz and non-haz. constituents)

Constituent	%
	%
	%
	%
	%
	%
	%
	%

5. Regulatory Status (check all that apply)

- Hazardous Waste per 40 CFR 261 ☐
- CESQG per 40 CFR 261.5 ☐
- Universal Waste per 40 CFR 273 ☐
- Used Oil per 40 CFR 279 ☐
- State Regulated Waste ☐
- HHW per 40 CFR 261.4(b)(1) ☐
- TSCA per 40 CFR 761 ☐
- Non Hazardous Waste ☑
- Other Exempt Waste per 40 CFR 261 ☐

Describe: ____

Form Code ____ Source Code ____

6. Hazardous and Chemical Properties

None	☑	Oxidizer	☐
Water Reactive	☐	Ignitable	☐
Shock Sensitive	☐	Medical Waste	☐
Air Reactive	☐	Dioxins	☐
Explosive	☐	Benzene NESHAP	☐
Pyrophoric	☐	Pesticide/Herbicide	☐
Reactive Cyanides	☐	Polymerizable	☐
Reactive Sulfides	☐	Radioactive	☐
Phenols	☐	Asbestos	☐

Customer Disposal Preference (if any):

7. Metals (Inorganic) None ☑ TCLP ☐ SCLP ☐ Generator Knowledge ☐

D004 Arsenic (5mg/l)		D011 Silver (5mg/l)		Manganese	
D005 Barium (100mg/l)		Aluminum		Molybdenum	
D006 Cadmium (1mg/l)		Antimony		Nickel	
D007 Chromium (5mg/l)		Beryllium		Thallium	
D008 Lead (5mg/l)		Cobalt		Tin	
D009 Mercury (0.2mg/l)		Copper		Zinc	
D010 Selenium (1mg/l)		Chromium			

8. Other Compounds (Organic) None ☑ TCLP ☐ SCLP ☐ Totals ☐ Generator Knowledge ☐

D012 Endrin		D023 o-Cresol		D033 Hexachlorobutadiene	
D013 Lindane		D024 m-Cresol		D035 Methyl ethyl ketone	
D014 Methoxychlor		D025 p-Cresol		D036 Nitrobenzene	
D015 Toxaphene		D026 Cresol		D037 Pentachlorophenol	
D016 2,4-D		D027 1,4-Dichlorobenzene		D038 Pyridine	
D017 2,4 5 TP (Silvex)		D028 1,2-Dichloroethane		D039 Tetrachloroethylene	
D018 Benzene		D029 1,1-Dichloroethylene		D040 Trichloroethylene	
D019 Carbon Tetrachloride		D030 2,4-Dinitrotoluene		D041 2,4,5-Trichlorophenol	
D020 Chlordane		D031 Heptachlor (& epoxide)		D042 2,4,6-Trichlorophenol	
D021 Chlorobenzene		D032 Hexachlorobenzene		D043 Vinyl chloride	
D022 Chloroform					

Generator Certification: I hereby certify that I have personally examined and am familiar with the above and attached description. To the best of my knowledge it is complete and accurate. No deliberate or willful omissions of composition or properties exist and all known or suspected hazards have been disclosed.

Name	John Freise	Title	Environmental Scientist
Signature	[signature]	Date	Friday, March 02, 2012

00119368

Please print or type
(Form designed for use on elite (12-pitch) typewriter.)

FRIS Contract #HMB1

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	N/A	1	800-924-6804	7417-1002985

5. Generator's Name and Mailing Address
United States Army Corps of Engineers
1645 S 101st East Ave
Tulsa, OK 74128-4637

Generator's Phone: 918-669-4915

Generator's Site Address (if different than mailing address)
United States Army Corps of Engi
Longhorn Army Ammunition Plant
Karnack, TX 75661

6. Transporter 1 Company Name: Stericycle Specialty Waste Solutions, Inc
U.S. EPA ID Number: MNS000110924

7. Transporter 2 Company Name
U.S. EPA ID Number

8. Designated Facility Name and Site Address
Stericycle Specialty Waste Solutions, Inc.
2120 Southwest Blvd
Tulsa, OK 74107

Facility's Phone: (918) 587-9664 Ext

U.S. EPA ID Number: OKD987084068

9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.
1. Non-Hazardous Waste soil	13	DM	Est 5451	P
2. Non Hazardous, Non-Regulated Liquids IDW Wastewater	11	DM	1780 Est	P
3.				
4.				

GENERATOR

13. Special Handling Instructions and Additional Information 1.Approval #915-01 2.App #912-00

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name | Signature | Month | Day | Year

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Richard Robison | Signature | Month | Day 7 | Year
Transporter 2 Printed/Typed Name | Signature | Month | Day | Year

DESIGNATED FACILITY

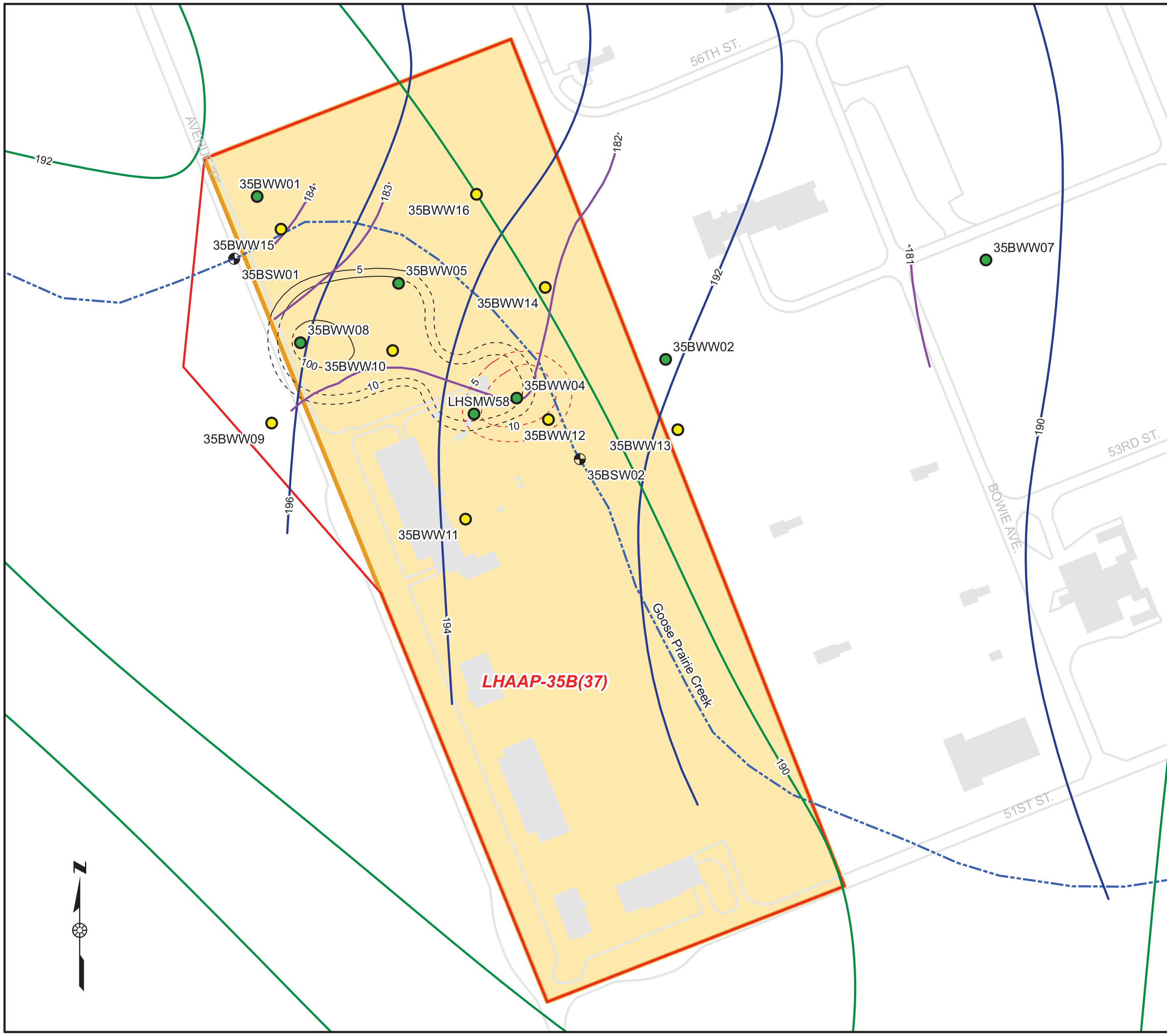
17. Discrepancy
17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:
17b. Alternate Facility (or Generator) U.S. EPA ID Number
Facility's Phone:
17c. Signature of Alternate Facility (or Generator) Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a
Printed/Typed Name | Signature | Month | Day | Year

GENERATOR'S/SHIPPER'S INITIAL COPY

APPENDIX H

Site Location Map



Legend

- Existing Shallow Wells
- New Shallow Wells
- Surface Water Sampling Location
- Groundwater Elevation Contour Dec 2007
- Groundwater Elevation Contour Sep 2000
- Groundwater Elevation Contour Dec 1998
- Goose Prairie Creek
- PCE Concentration Contour
- Inferred PCE Contour
- TCE Concentration Contour
- Inferred TCE Concentration
- LHAAP-35B LUC Boundary
- LHAAP-35B(37) Site

Notes:
1. Reporting limit (<5) results were considered not detected during contouring.
2. Concentrations reported in µg/L.
3. Concentrations from Dec 2006 sampling.

0 35 70 140 210 280 Feet

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

FIGURE 1
WELLS DISIGNATED FOR LONG-TERM MONITORING, SITE LHAAP-35B(37)
LHAAP-35B(37) & 67 REMEDIAL DESIGN

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

LHAAP35BLTM.mxd 08/04/11

00119370

APPENDIX I

Photographs

Clearing for MW 35BWW14

Installation of MW 35BWW11

Installation of MW 35BWW09

Surface Completion of MW 35BWW11

Completed MW 35BWW11

IDW from 35BWW14 Pending Analysis

APPENDIX J

Laboratory Report (CD-ROM)

APPENDIX B: SAMPLE ANNUAL LAND USE CONTROL COMPLIANCE CERTIFICATION DOCUMENTATION

Sample Annual Land Use Control Compliance Certification Documentation

In accordance with the Remedial Design dated ______________________ for LHAAP-35B (37) a certification of site was conducted by _________________________________ [indicate transferee] on ______________________.

A summary of land use control mechanisms is as follows:

- No residential use or residential development of the property.
- Groundwater restriction - restriction of the use of groundwater to environmental monitoring and
- testing until cleanup levels are met. The restriction against residential use of groundwater will remain in effect until the levels of the COCs in groundwater allow unrestricted use and unlimited exposure (UUUE). [Indicate whether groundwater restrictions are still required at LHAAP-35B (37)]

A summary of compliance with land use and restriction covenants is as follows:

- No residential use or residential development of the property.
- No use of groundwater, installation of new groundwater wells, or tampering with existing wells at LHAAP-35B (37).

I, the undersigned, do document that the certification was performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: ______________________________

Name/Title: ______________________________

Signature: ______________________________

Annual compliance certification forms shall be completed no later than March 1 of each year for the previous calendar year.

APPENDIX C: JULY 2012 AND MARCH 2013 SAMPLING EVENT VOC DATA

Appendix C: Summary of Monitoring Well Sampling VOC Data (July 2012 and March 2013 Sampling Events)
Remedial Action Work Plan for Site 37, Chemical Laboratory
Longhorn Army Ammunition Plant, Karnack, Texas

Location ID: Date Sampled:	Units	35B WW07 7/18/2012	35B WW14 7/18/2012	35BWW14 3/9/2013	35B WW01 7/17/2012	35B WW03 7/15/2012	35B WW04 7/17/2012	35BWW04 3/12/2013	35B WW05 7/16/2012	35BWW05 3/13/2013	35B WW06 7/16/2012	35BWW06 3/13/2013	35B WW08 7/16/2012	35BWW08 3/10/2013	35BWW08D 3/10/2013	35B WW09 7/16/2012	35BWW09 3/9/2013	35B WW-11 7/17/2012	LHS MW-58 7/15/2012	MW-58 3/12/2013
Volatile Organic Compounds (8260B)																				
1,1-Dichloroethane	ug/L	<0.125 U	*4.95*	*4.89*	<0.125 U	<0.125 U	*0.639* J	*2.11*	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U
1,1-Dichloroethene	ug/L	<0.5 U	***52.3***	***48.2***	<0.5 U	<0.5 U	*1.67*	*2.94*	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	<0.5 U	*0.656* J	<0.5 U
1,2-Dichloroethane	ug/L	<0.25 U	<0.25 U	*0.285* J	<0.25 U	<0.25 U	*0.256* J	*0.299* J	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
Benzene	ug/L	<0.125 U	*0.228* J	*0.242* J	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U
Chlorobenzene	ug/L	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	*0.169* J	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U
Chloroform	ug/L	<0.125 U	*0.195* J	*0.153* J	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U	<0.125 U
cis-1,2-Dichloroethene	ug/L	<0.25 U	*13.2*	*12.8*	<0.25 U	<0.25 U	*0.475* J	*1.05*	<0.25 U	*0.255* J	<0.25 U	<0.25 U	*0.305* J	*0.356* J	*0.353* J	*0.38* J	*0.431* J	<0.25 U	<0.25 U	<0.25 U
Tetrachloroethene	ug/L	<0.25 U	***21***	***21.8***	<0.25 U	<0.25 U	***48.9***	***45.4***	*1.09*	*0.998* J	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	***36.3***	***14.8***
trans-1,2-Dichloroethene	ug/L	<0.25 U	<0.25 U	*0.415* J	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U
Trichloroethene	ug/L	<0.25 U	***80.6***	***80.3***	<0.25 U	<0.25 U	***8.09***	***15.4***	***13.5***	***15.6***	<0.25 U	<0.25 U	***65.7***	***77.1***	***78.2***	***55.6***	***45.2***	<0.25 U	***5.17***	*3.39*
Vinyl chloride	ug/L	<0.25 U	***4.02***	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U	<0.25 U

Notes:

1) The analytical data was collected by Cherokee Nation, on behalf of the U.S. Army, as part of the Bio-plug demonstration study.

2) *Italic* numbers represent concentrations of those constituents are detected above the laboratory reporting limits.

3) ***Bold and Italic*** represent concentrations of those constituents exceeding their maximum contaminant levels (MCLs), if available, or TCEQ Tier 1 Protective Concentration Levels (PCLs).

3) J - The concentration is estimated.

4) U - the concentration of that constituent is below the laboratory quantitation limit.